

Submitted to:
Town of Dedham, Massachusetts

INTERNAL TV INSPECTION of SEWERS

Final Letter Report

September 1998

J-019164-0001

September 28, 1998

Mr. Paul G. Keane, P.E.
Commissioner
Town of Dedham Public Works
55 River Street
Dedham, MA 02026

Subject: Internal TV Inspection of Sewers
Final Letter Report

Dear Mr. Keane:

In accordance with our Agreement dated February 28, 1997, we are pleased to submit this final letter report on the internal TV inspection of sewers located throughout the town of Dedham. This letter report summarizes the findings of the TV inspections, and recommends a program for the rehabilitation of sewers with infiltration/inflow (I/I) sources and other structural defects identified in this investigation as well as previous investigations conducted by either the town or Metcalf & Eddy.

EXECUTIVE SUMMARY

In April of 1997, the town initiated a program to television inspect sewers in streets where roadway reconstruction is proposed by the town and/or the Massachusetts Highway Department (MHD) within the next several years. The objectives of the program were as follows:

- Identify infiltration/inflow (I/I) sources and defects
- Update system mapping
- Review known problem areas of system
- Develop recommended program of sewer system rehabilitation and maintenance needs, and
- Coordinate sewer rehabilitation with roadway improvements.

Between April and November 1997, approximately 123,000 feet of sewers were inspected by either pulling a closed-circuit television camera through the sewer pipeline or using a self propelled crawler camera to videotape the condition of the pipe from manhole to manhole. As part of this effort, the downstream end of the Lower Brook Interceptor (LBI), between Eastern Avenue and its terminus near Maverick Street, was also TV inspected. The purpose of this inspection was to investigate the physical condition and structural integrity of the LBI downstream of the new replacement interceptor for the East Brook Interceptor.

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Over the course of this investigation, the videotapes and logs for approximately 23,000 feet of sewer previously inspected by the town were reviewed to update and prioritize the recommended repairs to coincide with the objectives of the proposed sewer system rehabilitation program. Additional investigations were also performed to further pinpoint I/I sources and defects, and to address other sewer system related problems. The additional investigations included aboveground inspection of manholes, bucket cleaning of sewers, and review of known problem areas within the system.

This report summarizes the findings to date of the TV inspection work conducted within the town's sanitary sewer system, and recommends a program to reduce I/I quantities and improve system operation. The recommended program consists of four components as follows:

SEWER REHABILITATION

This component is divided into four categories: sewer pipeline rehabilitation utilizing trenchless technologies, sewer replacement, sewer relining, and rehabilitation of lateral service connections. The sewer pipeline repairs generally include joint testing and chemical sealing, spot repairs of structural defects, and chemical treatment for root control. The total estimated cost of the sewer pipeline repairs is approximately \$1,951,000.

Sewer replacement is recommended for approximately 17,310 feet of sewers. Included in this total is 3,950 feet of replacement sewer for Colburn Street, Common Street, East Street, Washington Street, and Wilson Avenue which have already been bid for construction. The total estimated cost for replacing sewers is approximately \$3,793,000.

Sewer relining is recommended for approximately 12,300 feet of sewers, including the majority of the Lower Brook Interceptor which was observed leaking an estimated 170,000 gallons per day over its entire length. The total estimated cost of relining is approximately \$3,033,000.

Rehabilitation of lateral service connections by cutting and/or grouting services or by digging and replacing is recommended for approximately 575 services. Further, it is recommended that the cutting and/or grouting of services be included as part of the sewer pipeline rehabilitation contract. Services requiring replacement would then be included in the sewer replacement contract. The total estimated costs of rehabilitating services under the two sewer contracts is approximately \$325,000 and \$294,000, respectively.

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MANHOLE REHABILITATION

Manhole rehabilitation is recommended for a total of 227 manholes identified as having I/I defects and/or require cleaning to remove sediment and debris accumulated in the bottom of the manholes. The manhole repairs generally include resetting or replacing frames and covers, chemical sealing and/or interior coating of walls, and repairs to the chimney, bench, and invert areas. The total estimated cost of the manhole repairs is approximately \$241,000.

PERIODIC O&M

To improve system operation, it is recommended that the town develop a program of periodic O&M including regularly scheduled cleaning and inspection of sewers, locating and inspecting any missing or buried manholes, and providing and maintaining access to all the sewers in cross-country easements. A sewer system O&M manual is currently being prepared as part of the East Brook Replacement Interceptor project to assist the town with this effort.

FURTHER INVESTIGATIONS

Based on review of the known problem areas within the system, it is recommended that the town conduct an engineering study of the sanitary sewers on Gaffney Road, Glenway, Locust Street, Nelson Drive, and Sherman Road. The purpose of the study would be to identify alternatives for eliminating problems with raw sewage overflows and/or odors from these sewers.

To address grease problems in the sanitary sewers, it is recommended that the town conduct a town-wide grease trap inspection program. The purpose of the inspections would be to check whether grease traps have been installed in restaurants/bars as required by the local and state plumbing codes.

Finally, it is recommended that the town implement a program of systematically inspecting and rehabilitating the sewers in each subarea until the entire system is completed. The objective of the program would be to reduce the quantity of I/I entering the system, and to minimize the impact of future rate increases. The proposed program would be phased over a 5, 10, or 15 year period depending on the funding available, and would include the inspection of all sewers and manholes not previously investigated followed by the design and construction of rehabilitation measures.

A summary table of the estimated capital costs for all components of the recommended program is provided on the following page. However, at this time, it is emphasized that the costs presented in this table are only planning level cost estimates for budgeting purposes. A more accurate estimate of the anticipated construction costs may be determined during the design phase(s) of the recommended program.

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Component	Total Estimated Cost
• Sewer Rehabilitation <ul style="list-style-type: none">- Sewer Pipeline Rehabilitation Utilizing Trenchless Technologies- Sewer Replacement (17,310 Feet)- Sewer Relining (12,300 Feet)- Rehabilitation of Lateral Service Connections<ul style="list-style-type: none">* Cutting and/or Grouting* Dig and Replace	\$1,951,000 \$3,793,000 \$3,033,000 \$325,000 \$294,000
• Manhole Rehabilitation	\$241,000
• Periodic O&M	N/C
• Further Investigations	TBD
Total	\$9,637,000

A phased approach is proposed for implementation of the recommended program. The phasing of the program will be a function of the funding options available to the town. As a first priority, the town should focus its efforts on the design and construction of the sewer pipeline (trenchless) and manhole rehabilitation contracts together with the replacement of sewers on Colburn Street, Common Street, East Street, Washington Street, and Wilson Avenue. The combined total estimated cost of these projects is approximately \$3,397,000.

The implementation of latter phases of the recommended program would address the relining contract and the other contract for replacing sewers. The combined total estimated cost of these projects is approximately \$6,240,000.

Based on review of the funding currently available to the town of approximately \$1.14M and the estimated costs of the recommended program of approximately \$9.64M, additional funds will be required in order to fully implement the program. Consideration should also be given to the costs associated with developing a program of periodic O&M and conducting further investigations of the system which have not been estimated at this time.

ENGINEERING REPORT

INTRODUCTION

In the Fall of 1996, the town identified for internal TV inspection approximately 30,000 feet of sewers in streets where roadway reconstruction is proposed by the town and/or the

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Massachusetts Highway Department (MHD) within the next several years. By televising the sewers in streets where roadway reconstruction is proposed, any sewer rehabilitation work that is necessary to repair I/I sources and defects may be incorporated into the roadway project. This approach is more cost-effective and allows the sewer rehabilitation and roadway reconstruction work to proceed in a more timely manner.

Following the start of work in April 1997, the scope of the area to be investigated was expanded to include the TV inspection of part of the Lower Brook Interceptor (approximately 6,000 feet of pipe) and an additional 74,000 feet of sewers in streets. The Lower Brook Interceptor (LBI) includes sections of 24-in. x 36-in. brick sewer and 15- to 24-in. vitrified clay pipe, which conveys flow from the central part of town west of Route 1 to the Neponset Valley Sewer which is owned and operated by the MWRA. Along its route, the LBI picks up flow from five sewer subareas and the East Brook Interceptor (EBI) which conveys flow from five other sewer subareas. In total, the LBI conveys flow from approximately 45% of the sewer area in the town of Dedham.

Because of concerns related to the impact(s) of the construction of a replacement interceptor for the EBI in 1997-1998, the town proposed to TV inspect the downstream end of the LBI between Eastern Avenue and its terminus near Maverick Street. With the construction of the replacement interceptor, it is anticipated that flows exiting the EBI at Eastern Avenue may increase initially due to the larger size and proper slope of the new pipe. The settlement that has occurred throughout the length of the existing EBI has been the primary cause of years of sewer surcharging problems in this area of town. By increasing the conveyance capacity of the EBI, it is anticipated that the backwatering effect of the sewer surcharging will be significantly reduced. This will allow the sanitary sewers discharging into the EBI to drain faster in response to increased flows during wet weather periods. Consequently, the ability of the replacement interceptor to convey more flow at a faster rate may have an impact on the LBI downstream of Eastern Avenue.

The town also proposed to TV inspect an additional 74,000 feet of sewers in streets. These sewers are all located in streets where roadway reconstruction is proposed by either the town or MHD. Therefore, it is to the town's advantage to investigate and rehabilitate the sewers in these areas in advance of the proposed roadway work. To this end, the Agreement between the town and Metcalf & Eddy was amended to incorporate the additional TV inspection work described above.

DESCRIPTION OF STUDY AREA

Figure 1 attached is an updated base map of the town showing the layout of the existing sanitary sewer system in digital format. As indicated by the highlighting, the TV inspection work conducted as part of this investigation was spread throughout the town. Figure 1 also highlights

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in a different color those sewers that were previously TV inspected by either the town or M&E. The results of these TV inspections have been incorporated into this report to provide a complete summary of the work performed to date as well as to prioritize the recommended program of sewer system rehabilitation for the town. This program is discussed in detail later in this report.

The base map was prepared using geographic information system (GIS) mapping data obtained from several sources. The base layer of information, including street layouts, names, and building locations was obtained from Boston Edison Company (BECO) through the town of Dedham. The layer of information for the sanitary sewers was developed using GIS mapping data obtained from the MWRA. However, since the base layer of information obtained from BECO was developed at a much smaller scale than the MWRA data, adjustments to the sewer layer were required. The sewer layer was adjusted using the centerline of street information included with the BECO data and GIS mapping techniques.

The sub-area and manhole number designations shown on the base map correspond to the numbering system previously established by M&E on the detailed map of the existing sewer system prepared by Pilling Engineering Company, Inc. in 1977. For sub-areas where manhole numbers have not previously been established, the nearest street address was used to identify the sewer reaches television inspected during this investigation. However, it should be noted that the mapping of detailed information (i.e., manhole numbers, sewer lengths) as shown in the figures attached is only partially complete. The purpose of the base mapping information presented in this report is to highlight all the sewers which have been TV inspected by either the town or M&E. Although other parts of the system have previously been mapped in detail, this information has not been added to the digital version of the base map yet. At this time, it is anticipated that the map will be updated further with more detailed information as time and funding permit.

SUMMARY OF INTERNAL TV INSPECTIONS

Internal TV inspection, including light and some moderate-to-heavy cleaning of approximately 123,500 feet of sanitary sewers, was conducted between April and November 1997. Prior to television inspection, each sewer segment was hydraulically cleaned. Internal TV inspection was then accomplished by either pulling a small closed-circuit television camera through the sewer pipeline while videotaping the condition of the pipe from manhole to manhole or by using a self propelled crawler camera. Defects within the sanitary sewers, such as structural problems, inflow/infiltration, root intrusion, and grease build up were recorded on logs for each manhole to manhole reach. Other observations, including longitudinal cracking of pipes, misaligned or broken joints, and break-in service laterals were also noted. Table 1 attached presents a summary of the infiltration sources and other structural defects discovered during the TV inspections. The table is organized by subarea and alphabetically by street name. Sewers identified with defects have been highlighted on Figure 2 attached.

In addition, there were a number of sewers which could not be inspected due to root blockages, surcharged conditions, and/or access problems (i.e., buried manholes, offset pipes). Collapsed pipe, protruding service connections (blocking the progression of the camera), severe pipe sags, and heavy debris in the pipes also prevented the complete inspection of certain reaches. Table 2 attached is a list of the reaches that were scheduled for inspection but were unable to be completed for the reason stated. These reaches require either root cutting, bypass pumping, raising or replacement of manholes, or heavy cleaning. In some cases, the collapsed sections or protruding service connections need to be repaired before the completion of the TV inspection of a specific reach.

As indicated in Table 1, evidence of or active infiltration was observed in a total of 310 of the 779 sewer segments inspected. The sanitary sewers on Bridge Street, High Street, and River Street, and the LBI appear to contribute the most significant quantities of infiltration, estimated to range from 25,000 gpd to 170,000 gpd. The quantity of infiltration entering the sanitary sewers was estimated based on visual assessment of each infiltration source. The total quantity of infiltration identified from the defects listed in Table 1 is estimated at approximately 560,000 gpd. This includes infiltration from services and those sewers previously identified with defects through investigations conducted by either the town or M&E.

During the TV inspections, a significant number of service connections were observed to have a constant flow of clear water running from the service, cracked pipe, or roots growing from the service. These service connections are suspected of leaking infiltration and other structural defects. The town may want to consider further investigation of service connections in these sewers to confirm whether they are contributing infiltration to the system. This may be accomplished by utilizing a small TV camera inserted from the main line sewer at the lateral which is then pushed via a motorized winch. With this type of camera setup, it is possible to inspect straight line distances of up to 50 feet. However, if there are bends or other fittings present, the length of lateral inspected may be limited to short distances of 20 to 25 feet. In general, a service lateral with a defect leaking infiltration would most likely be encountered at or near the lateral connection to the main line sewer where the depth of the service lateral is greatest in relationship to the groundwater level.

An alternative method of inspecting laterals is from the cleanout within the building to the main line sewer in the street. With this type of camera setup, it may be possible to inspect the entire length of the service lateral. However, it requires obtaining the permission of the property owner to enter the building and perform the inspection which can be a time consuming process, especially when scheduling a large number of lateral inspections.

Another factor to consider is the cost of conducting service lateral inspections which is relatively high in comparison to the cost for TV inspection of sewers. For this reason, it is often recommended that a representative test area be selected for inspection of laterals suspected of

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leaking infiltration to determine whether additional inspections are warranted. It should be noted that during the course of work for this project, a proposed test area was selected along High Street, between Mt. Vernon Street and Bussey Street. Table 3 attached is a list of 20 buildings with service laterals in the proposed test area suspected of leaking infiltration. This work should now be conducted as discussed later in this report under the section titled "Further Investigations".

Recommendations addressing the rehabilitation of infiltration sources as well as other problems identified in the sanitary sewers such as misaligned or open joints, root intrusion and grease build-up are presented later in the report as part of an overall program to reduce I/I and improve system operation and maintenance.

ADDITIONAL INVESTIGATIONS

Over the course of this study, additional investigations were performed to further pinpoint I/I sources and defects, and to address other sewer system related problems. The additional investigations included aboveground inspection of manholes, bucket cleaning of sewers, and review of known problem areas within the system. A more detailed discussion of these investigations follows:

Manhole Inspections

M&E field personnel visually observed and made note of the physical condition of many of the manholes opened for TV inspection purposes. Based on these aboveground inspections, the sewer manholes were generally found to be in good structural condition. However, there were a number of manholes with defects including walls, benches, and pipe connections leaking infiltration, cracked or chipped frames and covers, and insufficient mortar/cement in the chimney riser sections. Table 4 attached presents a summary of the manholes identified with defects during this investigation as well as previous investigations conducted by either the town or M&E. In total, there are 227 manholes identified as having a defect requiring repair and/or cleaning to remove sediment and debris accumulated in the bottom of the manholes. Figure 2 graphically illustrates the locations of these manholes.

Based on review of the TV inspection logs and videotapes, M&E also compiled a list of buried manholes for the town to locate and uncover as time permits. Table 5 attached is a copy of the list compiled by M&E and submitted to the town under separate cover in a letter dated October 16, 1997. As indicated in Table 5, a total of 31 manholes were identified as buried during these investigations. The locations of these manholes are also shown graphically in Figure 2.

In addition to the buried manholes, M&E reported to the town the location of two manholes with water mains passing through the manhole structure, and a third manhole with an active cross-

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connection to the MWRA water distribution system. The two manholes with water mains passing through are located on Colburn Street, in front of house #193, and Washington Street (southbound) in the sidewalk in front of house #975. The town has since requested that the Dedham-Westwood Water District (DWWD) relocate the water mains at both locations. The water main on Colburn Street will be relocated during the proposed construction of a replacement sewer to repair a collapsed section of sewer in the same general location. The scope of the proposed sewer replacement project is discussed in more detail later in this section. As of this writing, there are no formal plans to relocate the water main on Washington Street.

The cross-connection between the MWRA water distribution system and the town's sanitary sewer system is located on East Street near St. Luke's Church. The cross-connection consists of a series of three manholes. The first manhole contains a 12" blow-off valve for the existing MWRA water main on East Street. The discharge side of the blow-off valve is piped underground to a second manhole located in the street. The second manhole functions as a clear well for the discharge water from the blow-off valve. The water enters at the bottom of the manhole and then overflows to a third manhole which is the sanitary sewer on East Street. The cross-connection was first discovered while conducting the field survey work for the proposed replacement sewers on East Street which are discussed later in this report. At the time of the field survey, a constant flow of clean water was observed entering the sewer system from the clear well manhole. After inspecting the site and reporting the findings to the MWRA, M&E was informed that the blow-off valve for the water main had mistakenly been left open during its last scheduled exercise. The valve was then immediately closed by the MWRA after being left partially open for approximately a three month period.

As requested by the town, the MWRA has developed plans to eliminate the cross-connection prior to the MHD's proposed reconstruction of East Street between Route 95 and the rotary at Sprague Street. The MWRA has indicated that the cross-connection will be eliminated in coordination with the proposed construction of replacement sewers for this area of East Street.

Bucket Cleaning

Under a separate contract between the town of Dedham and Araco Sewer & Drain Service, approximately 9,800 feet of sewers were bucket cleaned to remove heavy accumulations of sediment and debris material and/or grease build-ups prior to TV inspection. This was accomplished utilizing a hydraulic sewer rodder to string a steel cable through the sewer which was then used to pull steel bristle brushes of varying size back and forth from manhole to manhole.

Table 6 attached presents a list of the sewers where bucket cleaning was performed. Many of these sewers were considered as problem areas of the sewer system due to the number of complaints received from residents with service back-ups. As a result of performing the work,

the number of complaints received by the town DPW has been significantly reduced. Fewer complaints generally translates into less time and effort required of town forces to respond to emergency situations which often occur during non-business hours and result in overtime pay. However, as a preventative measure, the town should consider inspecting these sewers on a periodic basis to determine when, and if, additional cleaning is required. A more detailed discussion of suggested sewer operation and maintenance (O&M) procedures is discussed later in this report under the section titled "Periodic O&M".

Review of Known Problem Areas

Following is a review of known problem areas within the town of Dedham's sewer system based on discussions with town personnel, and as a result of performing other work for the town throughout the course of this investigation.

Sanitary Sewer Overflows. Surcharging of sanitary sewer manholes is known to occur in a number of locations due to either partial/full pipe blockages or other flow related restrictions as described in the paragraphs below:

Colburn Street. The sanitary sewer on Colburn Street has a collapsed section of pipe approximately 55 feet downstream of the manhole in front of house #193. As noted earlier, an existing water main also passes through this manhole. Due to the pipe collapse, however, sewage flow from 5-6 homes is unable to pass downstream for discharge into the MWRA trunk sewer. As a result, the town has to regularly pump sewage stored in the sewer and manholes located upstream of the collapsed section to prevent the occurrence of overflows and service back-ups. In addition, an abandoned root cutter partially obstructs the section of sewer between the manhole in front of house #193 and the pipe collapse. According to town personnel, the root cutter could not be removed after the head wedged itself in the vicinity of the collapsed sewer section, and was left-in-place by cutting the sewer rod from within the sewer.

To repair the collapsed section of pipe, construction of a replacement sewer from manhole to manhole is scheduled for late Fall 1998. The proposed work will also include relocation of the existing gas and water mains in Colburn Street.

Common Street. The sanitary sewer on Common Street is suspected of having a collapsed section of pipe approximately 85 feet upstream of MH 59. Similar to the pipe collapse on Colburn Street, sewage flow is unable to pass downstream. As a result, periodic pumping is required to prevent the occurrence of overflows and service back-ups. In addition, an abandoned sewer rod hose partially obstructs the section of sewer between MH 59 and the pipe collapse. According to town personnel, the sewer rod hose could not be removed after

the nozzle head wedged itself in the vicinity of the collapsed sewer section, and was left-in-place by cutting the sewer rod at MH 59.

Construction of a replacement sewer from manhole to manhole to repair the collapsed section of pipe on Common Street is scheduled for late Fall 1998. This work, together with other sewer replacement work on East Street and Washington Street, was bid with the replacement work on Colburn Street under one construction contract.

Fairbanks Road and Rustcraft Road. Surcharging of manholes along Fairbanks Road and Rustcraft Road occurs as a result of the poor system hydraulics in the East Brook Interceptor which limit its conveyance capacity during wet weather, high flow conditions. Since the completion of construction in February 1998, the replacement interceptor between Fairbanks Road and Eastern Avenue has alleviated the occurrence of overflows in these areas.

Gaffney Road. The sanitary sewer on Gaffney Road has a long history of maintenance problems due to its poor condition, and requires further investigation to determine whether the sewer should be replaced or rehabilitated. As requested by the town, M&E prepared a request for proposal (RFP) to conduct a feasibility study of alternatives for the Gaffney Road sewer. The RFP is currently being reviewed by the town.

Glenway. The sanitary sewer on Glenway was constructed with minimal cover of less than 12 inches. As a result, whenever the sewer experiences a back-up (i.e., during wet weather, high flow conditions), it is possible for raw sewage to overflow at the upstream end of the sewer on Glenway. This has been an on-going maintenance problem for the town that requires further investigation to determine whether the area may be serviced by either a gravity sewer constructed to an alternate discharge location or a small pumping facility such as a grinder pump system. The town should consider developing an RFP to conduct an engineering study of the existing sewer problems on Glenway, similar to the RFP developed for Gaffney Road.

Jefferson Street. The sanitary sewer on Jefferson Street has experienced problems with overflows due in combination to a root blockage located approximately 80 feet downstream of MH 72 and a change in the pipe slope just prior to entering MH 46. Through bucket cleaning and jetting, the root blockage has been cleared from the sewer. This should alleviate some of the problems with sanitary sewer overflows in this area. However, root control treatment followed by joint testing and sealing is necessary to prevent the roots from growing back and to seal the pipe joints. Additionally, approximately 15 feet of sewer requires replacement beginning at MH 46 and continuing upstream. The pipe in this area changes in slope and is damaged with cracking. Due to the change in slope, sewage flow passing downstream into MH 46 is throttled resulting in a backwater effect. During wet

weather, high flow conditions, the throttling of flow at this location may contribute to the problems with sanitary sewer overflows further upstream at MH 72.

Locust Street. The sanitary sewer on Locust Street has recently experienced problems with overflows and service back-ups. Similar to Glenway, the sewer on Locust Street was constructed with minimal cover and slope most likely due to the presence of ledge in the area. This is one of the contributing factors to overflows at the upstream end of the sewer. Another contributing factor is the downstream connection between the Locust Street and Alden Street sewers. Through internal TV inspection, the town determined that the sewer on Locust Street connects directly into the sewer on Alden Street, similar to a service lateral connection. The connection is located approximately 15 feet downstream of the sewer manhole at the intersection of the two streets. It should also be noted that there is an 8-inch stub installed at the manhole for connection of a lateral sewer from Locust Street which apparently was never utilized. To alleviate problems with overflows on a short-term basis, the town has been regularly cleaning and flushing the sewers in this area every 1-2 weeks. However, an engineering study should be conducted to identify an alternative that permanently eliminates overflows at this location.

Nelson Drive. The sanitary sewer on Nelson Drive has been an on-going maintenance problem for the town due to its poor layout and construction. The sewer requires flushing on a periodic basis to remove the build-up of solids and other debris material from the sewer. This often results in complaints from residents about strong sewer odors in the homes, in particular house #34. Although some of the odor problems experienced at these homes may be attributed to the internal plumbing, the town should consider further investigation of the sewer on Nelson Drive to identify whether corrective measures are warranted.

Sherman Road. The sanitary sewer on Sherman Road discharges directly into the MWRA collection system, and has experienced occasional problems with overflows as a result of system surcharging. The overflows occur at an intermediate manhole located between the MWRA interceptor and the permanent metering site operated by the MWRA on Sherman Road. Further investigation of the sewers in this area is warranted to determine the cause(s) of sewage overflows.

Wilson Avenue. The sanitary sewer on Wilson Avenue, including the portion crossing under Route 1, was replaced this past spring as part of the Roadway and Utility Improvements at Wilson Avenue construction contract. Replacement of the sewer was necessary to repair structural defects in the sewer including a partially collapsed section under Route 1. Also as part of the project, a new storm drain was installed to replace an existing drain which had collapsed. Since August 1996, an electric pump had been installed as a stop gap measure to convey stormwater runoff entering the drain on Wilson

Avenue. During periods of moderate-to-heavy rainfall, the electric pump was unable to convey all the flow and supplemental pumping with gas pumps was required. This pumping operation became costly, and was a major driving force for rehabilitating the sewer and drain on Wilson Avenue.

Grease Control. Sewer service back-ups resulting from the build-up of grease in the sewers has been an on-going problem for the town of Dedham, especially in the vicinity of Route 1 where there are a number of commercial food establishments (i.e., Bickford's, TGI Fridays) and hotels/bars with restaurant facilities. To address this issue, the town requested that M&E develop an approach to further investigate the source(s) of the grease problem. The details of the proposed approach were presented to the town in a letter dated June 26, 1997. The proposed approach called for the inspection of both interior and exterior grease traps for all restaurants/bars followed by the implementation of control measures at the source(s) where grease is discharged to the system. By controlling grease at the source, there is less opportunity for grease to accumulate within the sanitary sewers and become a maintenance problem for the town. This may also reduce the town's expenditure of funds and labor resources to deal with sewer back-ups on an emergency call basis.

Bridge Street Water Treatment Plant (WTP). An investigation of the Bridge Street WTP discharge of residual sludge to the Dedham sewer system was conducted to determine the nature of the discharge and its impact(s) on the sanitary sewer system. The details of the investigation were presented to the town in a letter dated October 17, 1997. In summary, there are two major concerns with the discharge. First, the concentration of solids and of several priority pollutant metals detected in the residual sludge may exceed the discharge limits currently allowed by the MWRA and the town sewer use regulations. As the permitting authority for the discharge, the MWRA has been reviewing the Dedham-Westwood Water District's (DWWD) application for renewal of its permit. The MWRA shares the town's concern about the nature of the discharge and has initiated its own investigation as part of the permit renewal application process. The MWRA has indicated plans to schedule a series of meetings with representatives of the town and DWWD to resolve the issues surrounding renewal of the permit. As of this writing, however, the MWRA has taken no further action.

The second concern with the discharge of residual sludge from the Bridge Street WTP is the location where it enters the system at the terminus of the existing 8" sewer on Bridge Street. At this location, there is no constant flow of water in the sewer to flush material downstream and only a handful of service connections contribute sewage on an intermittent basis. As a result, there is the potential for heavy solids materials (i.e., filter sand from backwash operations) to settle out in the sewer going toward Common Street. To minimize the accumulation of sediment and debris, it is recommended that the town flush the Bridge Street sewer on a periodic basis. The town should also monitor the type and amount of material removed from the sewer during cleaning operations.

REHABILITATION ALTERNATIVES

Many different techniques currently are being used for rehabilitation of sewer systems in the United States. A brief discussion of each technique considered for the rehabilitation of manholes and sewers in Dedham is presented below.

Sewer Rehabilitation

There are two general methodologies available for rehabilitating sewers; dig-and-replace and trenchless technologies. Dig-and-replace involves locating a defective pipe or pipe segment(s), excavating, and either repairing or replacing as necessary. Trenchless technologies require little or no excavation as repairs are made internal to the existing pipe using manholes or localized excavations for pipe access. These techniques, although limited, may also be used to repair leaking service connections.

Dig-and-Replace. Dig-and-replace is typically used when there are multiple defects in a given sewer and/or when the structural integrity of the sewer is in question. This method may be used when entire sewer reaches exhibit multiple defects such as cracks, separated joints, root intrusion, or broken and missing pipe. Dig and replace may also be used for individual pipe segments (e.g., spot repairs) when there are localized defects. For example, if there is a section of collapsed pipe, but the rest of the line is in excellent condition, only the collapsed section may need to be replaced.

Joint Testing and Sealing (Trenchless). In the event of leaking or cracked joints, testing and sealing may be effective in reducing infiltration if the pipe is in structurally sound condition. Subsequent to hydraulic cleaning, each joint along the length of the sewer is pressure tested with air. If the joint fails the test, a chemical sealer is injected to prevent infiltration from entering the system at that location.

Internal Spot Repairs (Trenchless). Where a pipe is broken or cracked, spot repairs may be performed utilizing chemical grout, similar to joint sealing, or epoxy compounds for greater strength. Short cured-in-place liners or rigid sleeves may also be used for spot repair of more significant defects. Between July and August 1997, a total of 12 short cured-in-place liners were test installed by Araco Sewer & Drain Service under a separate contract with the town. Table 7 attached lists the locations where the test liners were installed. It is recommended that the town reinspect these locations to confirm that the test liners do not leak and are fully adhered to the sewer.

Root Control (Trenchless). Trees and shrubs adjacent to sewer lines often cause damage to sewer pipes via root intrusion. The roots may enter the pipe through separating joints, damaged service connections, or under extreme conditions, by breaking through the pipe itself. The

resultant openings allow infiltration to enter the sewer system. Further, the roots can block the pipe and restrict flow in the pipe. When this occurs, the roots may be removed by grinding and cutting. After removal, a herbicide is applied to kill the roots in the immediate vicinity of the pipe. Resultant root damage may be repaired with other trenchless technologies where appropriate.

Sewer Relining (Trenchless). In sewer lines where there are multiple cracks, breaks and defective joints, it can be cost-effective to reline the pipe. Relining is an attractive alternate when conventional dig-and-replace is too disruptive for a given location (i.e., sewer located within a busy roadway). Relining can also be used where the sewer line is relatively deep and a minimum number of service connections are present. There are several proprietary methods available for relining. They range from mortar linings that are spun onto the interior surface of the existing pipe to fold-and-form or cured-in-place tube liners. Insituform® is one example of cured-in-place pipe relining technology. Relining is generally not applicable where severe deformation of the pipe has occurred. Some companies also have relining methods that can be used on service laterals.

Pipe Bursting (Trenchless). In sewer lines where replacement is warranted, pipe bursting may represent an attractive alternative to conventional dig-and-replace methods. Pipe bursting involves pulling a mechanical device through the damaged pipe breaking apart the existing sewer pipe as it advances. Attached to the device is a continuous length of high density polyethylene pipe (HDPE) which replaces the existing pipe from manhole to manhole. This method can also be used to increase the diameter of the existing pipe by an incremental pipe size or more depending on the size of the existing pipe and the soil conditions.

Microtunneling (Trenchless). Microtunneling is a “state-of-the-art” method of installing new sewer pipe or replacing existing sewer pipe without extensive excavations. This method is mainly used when new pipe is to be installed at significant depths, through environmentally sensitive areas, or across major arterial streets. Microtunneling is a form of “pipe jacking” that utilizes a remote control, steerable boring machine that provides continuous support to the excavated face. A new pipe is then jacked in behind the microtunnel machine. This method can also be used to replace an existing pipe in place following the same line and grade.

Manhole Rehabilitation

Techniques identified below may be used to reduce flows from infiltration and inflow that enter the sanitary system through defective manholes. Some of these techniques also provide improvements to the structural integrity of the manhole.

Manhole Inserts. These plastic inserts are bowl-shaped and collect inflow that enters a manhole through poorly fitting or perforated covers. Manhole inserts can reduce the amount and rate of

inflow entering the system at a relatively inexpensive cost. At the same time, however, the inserts may become an operation and maintenance problem as they grow older and deteriorate beyond repair if removed. Perforated covers should be replaced if possible since manhole inserts are generally considered as a short-term interim repair. Inserts are most effective when manholes are in depressed locations and cannot be raised. In areas where the frame and cover is solid but subject to ponding, the frame and cover should be raised and reset.

Replace Frame and Cover. When the frame or cover of a manhole is chipped, cracked, or perforated, excessive amounts of inflow may enter the system. The defective frame and/or cover should be replaced with a new manhole frame and/or cover.

Reset Frame and Cover. Leaking around the manhole frame and cover may only require that the frame be reset. This can reduce the amount of inflow during storm events. Resetting assumes that the existing frame and cover are in good condition.

Raise Manhole. Manholes can be raised by removing the frame and cover and building onto the existing brick work or corbel to the desired higher elevation. This technique may be used in paved and unpaved areas. The existing frame and cover can be reused if in good condition. Raising a manhole may reduce inflow quantities in those situations where the manhole is located in an area that accumulates water.

Repair Chimney. Chimney repair consists of sealing the manhole frame to the brick masonry of the chimney and patching any visible leaks to minimize inflow or infiltration sources. This repair may only be effective if the overall condition of the manhole is good. If the manhole condition is poor, additional repairs to seal the manhole from top to bottom may be required such as chemical sealing and interior coating or manhole relining.

Chemical Sealing. Chemical sealing can be effective in reducing and/or eliminating infiltration through defects in manhole walls, bases and inverts. One or more holes are drilled in the wall of a manhole through which chemical compounds, such as grout, are injected. When the chemicals react, they create an impermeable plug. If the manhole is in poor structural condition, however, this repair may not be effective in sealing the entire manhole since infiltration tends to migrate and leak through other locations within the manhole. As a result, chemical sealing together with interior coating of the manhole may be required.

Interior Coating. Interior coating of a manhole may be effective in sealing interior walls against infiltration when a manhole is in good structural condition. An impermeable coating, such as epoxy or polyurethane, is sprayed on manhole walls to seal against any leaks. Typically, the entire manhole is sealed, not just a limited area. However, as mentioned above, it may be necessary to chemically seal the manhole first before applying the interior coating.

Manhole Replacement or Relining. Under some circumstances, the rehabilitation techniques described above may not be sufficient and replacement of the defective manholes may be recommended. However, it may be more cost-effective to reline a manhole rather than replace it with a new one. Brick manholes that are old will often have several defects that could require multiple repairs and have minor structural defects. A simple interior coating can reduce leakage, but relining can be more thorough and provide some additional structural support.

RECOMMENDED PROGRAM

Based on the investigations performed during this and previous studies, it is recommended that the town implement an overall program to reduce I/I quantities and improve system operation. The program would consist of four components: sewer pipeline rehabilitation, manhole rehabilitation, periodic operation and maintenance, and further investigation of the town's sewer system. A discussion of each component of the program follows.

Sewer Rehabilitation

As summarized in Table 1 attached, numerous infiltration sources and defects were observed in the sewer pipelines, including joints either actively leaking or with evidence of previous leakage, structural defects such as broken or cracked pipe, and root intrusion. To repair these defects, it is recommended that the town implement the design and construction of sewer pipeline rehabilitation measures. Table 8 attached presents a detailed summary of the recommended sewer repairs along with estimated costs including an allowance for engineering and contingencies. As indicated, the recommended sewer repairs generally include joint testing and chemical sealing, spot repairs of structural defects, and chemical treatment for root control. Both the joint testing and sealing and the root control work are fairly straightforward. However, the spot repair work is more complex due to the variety of repair methods that can be used, including short liners, chemical grout, and epoxy resins. The total estimated cost of the sewer pipeline repairs is approximately \$1,951,000. These repairs should be undertaken as a single rehabilitation contract since they are typically completed by a pipeline services company.

In addition to the above noted sewer defects, approximately 29,620 feet of sewer have significant defects that warrant more substantial repairs such as excavation and replacement or relining of the existing sewer. These repairs are normally completed by either a general contractor, if replacement is the selected rehabilitation method, or by a specialized pipe lining firm, if relining is the selected method. As indicated in Table 8, approximately 17,310 feet of sewer is recommended for replacement. Included in this total is 3,950 feet of replacement sewer for Wilson Avenue, which was constructed in the Spring of 1998, and Colburn Street, Common Street, East Street, and Washington Street, which are scheduled for construction in the Fall 1998. The remaining 12,360 feet of sewer requiring replacement are recommended for design and construction as a separate rehabilitation contract. The total estimated cost for replacing sewers,

including allowances for engineering and contingencies, is approximately \$3,793,000. This includes an estimated cost of approximately \$880,000 for replacing the sewers on the aforementioned streets.

Relining is recommended for approximately 12,300 feet of sewers, including the majority of the Lower Brook Interceptor which was observed leaking an estimated 170,000 gpd over its entire length. Due to the economy of scale, it would be more cost effective for the town to perform all the relining work under a single pipe lining contract. However, if funding limitations require dividing the relining work, the LBI, with its large diameter and sections of irregular shaped pipe, lends itself to be a stand alone contract. At this time, the total estimated cost of relining, including allowances for engineering and contingencies, is approximately \$3,033,000. This includes an estimated cost of approximately \$2,148,000 for relining the Lower Brook Interceptor.

Table 8 also includes estimated costs for the rehabilitation of lateral service connections by cutting and/or grouting services or by digging and replacing. Since the cutting and/or grouting of services is performed from within the main line sewer, it is recommended that this work be included as part of the sewer pipeline rehabilitation contract. The lateral service connections which require replacement would be included in the dig and replace contract for sewers. The total estimated costs of rehabilitating services under the two sewer contracts, including allowances for engineering and contingencies, is approximately \$325,000 and \$294,000.

Manhole Rehabilitation

As summarized in Table 4 attached, 227 manholes were identified as having I/I structural defects and/or require cleaning to remove sediment and debris accumulated in the bottom of the manholes. To repair the I/I defects, it is recommended that the town implement the design and construction of manhole rehabilitation measures. Table 9 attached presents a summary of the recommended manhole repairs along with estimated costs, including an allowance for engineering and contingencies. The manhole repairs generally include resetting or replacing frames and covers, chemical sealing and/or interior coating of walls, and repairs to the chimney, bench, and invert areas. The total estimated cost of the manhole repairs is approximately \$241,000. It should be noted, however, that some of the manhole repair work could be performed by town forces (i.e., manhole cleaning, resetting of manhole frames and covers) which would likely reduce the overall cost of the manhole repairs.

Periodic O&M

In addition to the manhole and sewer pipeline repairs, it is recommended that the town develop a program of periodic O&M for the sewer system. As mentioned earlier, bucket cleaning of approximately 9,800 feet of sewers was required prior to TV inspection. This represents roughly 10 percent of the sewers inspected during this investigation. Further, through discussions with

town personnel, and after review of the TV inspection videotapes, an additional 12,750 feet of sewers requiring further cleaning due to the presence of excess debris material or grease have been identified. Table 10 attached is a complete listing of the sewers which require heavy cleaning by either jetting or bucketing. On September 23, 1998, the town received bids to perform this work, including internal TV inspection of the sewers subsequent to cleaning. The estimated cost of the cleaning and TV inspection based on the bids is approximately \$40,000.

To monitor the system for future cleaning needs, it is recommended that the town perform periodic inspections at key locations where debris material tends to build-up. The sewers listed in Tables 6 and 10 attached should provide a good indication of where the system experiences problems with the build-up of debris material. As a starting point, the inspections should be performed on a semi-annual basis at a minimum. This schedule may then be adjusted accordingly based on the findings of the first inspection.

As time permits, the town should take the necessary steps to locate and inspect any missing or buried manholes as identified in Table 5 attached. The field location and inspection of manholes may be performed by town personnel.

Finally, the town should also consider providing and maintaining access to all the sewers in cross-country easements. This may involve the construction of access roads through easements and/or periodically clearing and grubbing the vegetated growth within the sewer easement. By providing access to these sewers, the town will be more prepared to handle an emergency situation should a problem occur.

Further investigations

Further investigation of the Dedham sewer system is necessary to address problem areas of the system and to continue with the identification of I/I sources for subsequent rehabilitation. As noted earlier, the sanitary sewers on Gaffney Road, Glenway, Locust Street, Nelson Drive, and Sherman Road continually experience problems with raw sewage overflows and/or odors. At this time, an engineering study is required to identify alternatives for eliminating these existing sewer problems. To assist the town, M&E can develop a scope of work for each of these projects which may be used as the basis for estimating the investigation phase costs.

To address grease problems in the sanitary sewers, it is recommended that a town-wide grease trap inspection program be conducted. The purpose of the inspections would be to check whether grease traps have been installed in restaurants/bars as required by the local and state plumbing codes. Both interior and exterior grease traps would be inspected during this program. Following the completion of the town-wide inspection program, the town should formulate a plan to further address grease control in the sanitary sewer system. Potential control measures to consider include, but are not limited to the following:

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- Penalties and fines for non-compliance,
- Periodic submittal of cleaning and maintenance logs by restaurant/bar owners,
- Regular inspection of restaurants/bars by the Board of Health, and
- Sampling of effluent flow discharged to the sewer system by restaurants/bars.

The implementation of control measures, however, will be a function of the resources available to the town to administer the program.

The town should also continue its efforts to identify and rehabilitate I/I sources and structural defects within the sewer system. As demonstrated by the TV inspection results presented in this report, most all of the sewers inspected to date require some form of rehabilitation to either replace or extend their service life. This is to be expected given the fact that the majority of the system was constructed of vitrified clay pipe which is well over 50 years old. At this time, therefore, it is recommended that the town implement a program of systematically inspecting and rehabilitating the sewers in each subarea until the entire system is completed. The objective of the program would be to reduce the quantity of I/I entering the system, and to minimize the impact of future rate increases by the MWRA. Based on flow metering conducted by the MWRA, the average daily flow from Dedham in 1997 was 4.88 million gallons per day (mgd). Of this total, approximately 58% of the average daily flow, or 2.85 mgd, is estimated to be infiltration. At this infiltration rate, the estimated annual sewer service charge to the town of Dedham using the MWRA's sewer rate structure for FY99 (\$638.45 per million gallon) would be approximately \$665,000. Thus, a significant cost savings may be realized by reducing infiltration to the system.

The proposed program would be phased over a 5, 10, or 15 year period depending on the funding available, and would include the inspection of all sewers and manholes not previously investigated followed by the design and construction of rehabilitation measures. In selecting the areas to include in each phase of the program, priority would be assigned to areas with high infiltration rates as determined by past I/I studies. Additional consideration would also be given to the areas where roadway improvements are proposed. To assist the town in developing such a program, M&E can prepare planning level costs estimates for investigating and rehabilitating the remainder of the system. This would be accomplished by projecting the costs from the work conducted to date which covers approximately one-third of the system.

Finally, as noted earlier, it is recommended that the town TV inspect the lateral service connections within the representative test area selected along High Street, between Mt. Vernon Street and Bussey Street. Table 3 attached is a list of 20 buildings with service laterals in the proposed test area suspected of leaking infiltration. Based on the results of these inspections, a determination can be made as to whether additional inspections are warranted. The total estimated cost for conducting the lateral inspections is approximately \$20,000.

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The table below presents a summary of the estimated capital costs for all components of the recommended program. However, at this time, it is emphasized that the costs presented in this table are only planning level cost estimates for budgeting purposes. A more accurate estimate of the anticipated construction costs may be determined during the design phase(s) of the recommended program.

Component	Total Estimated Cost
• Sewer Rehabilitation <ul style="list-style-type: none">- Sewer Pipeline Rehabilitation Utilizing Trenchless Technologies- Sewer Replacement (17,310 Feet)- Sewer Relining (12,300 Feet)- Rehabilitation of Lateral Service Connections<ul style="list-style-type: none">* Cutting and/or Grouting* Dig and Replace	\$1,951,000 \$3,793,000 \$3,033,000 \$325,000 \$294,000
• Manhole Rehabilitation	\$241,000
• Periodic O&M	N/C
• Further Investigations	TBD
Total	\$9,637,000

PROGRAM FUNDING AND IMPLEMENTATION SCHEDULE

The town appropriated \$4.98M under Article 36 of the 1995 Annual Town Meeting for the purpose of construction and/or reconstruction of town sewers. The table on the following page presents a summary of the sewer system rehabilitation projects that have been or are scheduled to be funded under this appropriation. Also included in this table is a column identifying the grant/ loan funding obtained under Phase 2 of the MWRA's financial assistance program. As noted in the table, Article 13 of the 1996 Annual Town Meeting authorized the borrowing of \$355,375 from the MWRA as a part of the \$4.98M authorized by Article 36. This amount is equivalent to 75% of the town's allocation of \$473,700 under Phase 2 of the MWRA's 25% grant/75% zero interest loan program. Previous to Article 36, the town authorized a separate borrowing from the MWRA of \$201,450, or 75% of its Phase I allocation of \$268,600.

As indicated in the table, the total town funding for projects under Article 36 is approximately \$3.84M with the majority going toward the construction of the East Brook Replacement Interceptor. Thus, a balance of \$1.14M is estimated to remain for upcoming sewer rehabilitation projects.

SEWER SYSTEM REHABILITATION PROJECTS FUNDED UNDER ARTICLE 36 OF 1995 ANNUAL TOWN MEETING

Project Name	Status	Estimated Project Cost	MWRA 25% Grant ⁽¹⁾	Town Funding Total	Cumulative	Drawdown of \$4.98M
East Brook Interceptor Replacement - Construction	Ongoing	\$2,706,879	\$0	\$2,706,879	\$2,706,879	\$2,273,121
Internal TV Inspection/East Brook Interceptor Pre-Construction Flow Monitoring	Ongoing	\$226,340 ⁽²⁾	\$51,585	\$174,755	\$2,881,634	\$2,098,366
Heavy/Bucket Cleaning of Sewers and Emergency Repairs performed by Araco Sewer & Drain	Completed ⁽³⁾	\$152,009	\$0	\$152,009	\$3,033,643	\$1,946,357
Sewer System Rehabilitation - Design/Construction for East Street, Washington Street, and Wilson Avenue	Ongoing	\$880,000	\$74,265	\$805,735	\$3,839,378	\$1,140,622
Totals		\$3,965,228	\$125,850	\$3,839,378		

Notes:

(1) Article 13 of 1996 Town Meeting authorized borrowing of \$355,275 under Phase 2 of the MWRA's financial assistance program.

This article also made the borrowing a part of the \$4.98M authorized by Article 36 of 1995 Town Meeting.

(2) Estimated project cost does not include grant/loan funding provided under Phase I of the MWRA financial assistance program.

(3) Indicates estimated project costs are final.

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On the following page, there is also a more detailed table summarizing the current status of the MWRA 25% grant/75% zero interest loan funding obtained by the town. As of July 31, 1998, the town had applied for the entire balance of the \$742,300 allocated to the town under Phase 1 and 2 of the MWRA's financial assistance program. Additionally, the town has accrued interest of approximately \$27,210 in the MMDT account established by the town for participation in the MWRA program.

On July 8, 1998, the town received a letter from the MWRA regarding the approval of the third phase of the I/I financial assistance program. Under this phase, the town has been allocated a total of \$495,300. The MWRA will distribute the Phase 3 funds as a 45% grant/55% interest free loan. In order to obtain these funds, a funding application must be submitted to the MWRA by the end of the month prior to the distribution date for each fiscal quarter (i.e. November 15, February 15, May 15, and August 15).

The State Revolving Fund (SRF) program is another potential source of funding for the town. Under this program, which is updated on an annual basis, the town must submit a project evaluation form to the Massachusetts DEP by December 15th for priority ranking. In February of the following year, the DEP issues a priority list of all the projects competing for SRF financing. This list serves as the basis for selecting the projects to be included in the Intended Use Plan for SRF financing in the next calendar year. If approved for funding under the current SRF program, the town would be eligible for a subsidized loan which is equivalent to a 25-30% grant. However, local funding must be obtained by June 30th, and a loan application must be submitted by October 15th. For construction projects, the loan application must also include plans and specifications.

For the purpose of this report, a phased approach is proposed for implementation of the recommended program. The phasing of the program will be a function of the funding options available to the town. As a first priority, the town should focus its efforts on the design and construction of the sewer pipeline (trenchless) and manhole rehabilitation contracts together with the replacement of sewers on Colburn Street, Common Street, East Street, Washington Street, and Wilson Avenue. The combined total estimated cost of these projects is approximately \$3,397,000. The sewer replacement work on Wilson Avenue has already been completed. The sewer replacement on the other streets is scheduled to begin in the Fall 1998.

The latter phases of the recommended program would include the two relining contracts and the other contract for replacing sewers. The combined total estimated cost of these projects is approximately \$6,240,000. Based on review of the funding currently available to the town and the estimated costs of the recommended program, additional funds will be required in order to fully implement the program. Consideration should also be given to the costs of conducting further investigations to address problem areas of the system and to continue with the

SUMMARY OF MWRA FINANCIAL ASSISTANCE PROGRAM

Project Name and Type	MWRA Project No.	Funding Phase	Estimated Project Cost	MWRA Financial Assistance ⁽¹⁾		Town Funding
				Grant	Loan	
East Brook Interceptor Replacement - Planning Study	WRA-12-1-114	1	\$25,407 ⁽²⁾	\$6,250	\$18,750	\$25,000
East Brook Interceptor Replacement - Design	WRA-12-3-130	1	\$173,091 ⁽²⁾	\$27,350	\$82,050	\$109,400
Sewer System Rehabilitation (Trenchless) - Design	WRA-12-3-130 ⁽³⁾	1	\$30,800	\$7,700	\$23,100	\$30,800
Internal TV Inspection/East Brook Interceptor Pre-Construction Flow Monitoring	WRA-12-3-130 ⁽³⁾ WRA-P2-12-1-237/245/261	1 2	\$119,660 \$226,340	\$45,635 ⁽⁴⁾ \$51,585	\$74,025 \$154,755	\$119,660 \$206,340
Sewer System Rehabilitation - Design/Construction for East Street, Washington Street, and Wilson Avenue	WRA-P2-12-3-246/247/262	2	\$880,000	\$74,265 ⁽⁵⁾	\$204,045	\$278,310
Totals			\$1,455,298	\$212,785	\$556,725	\$769,510
Totals			\$1,242,513			

Notes:

- (1) The town was allocated a total of \$742,300 under Phase 1 and 2 of the MWRA's financial assistance program. As of July 31, 1998, the town had applied for the entire balance of these funds, and had accrued interest of approximately \$27,210 in the MMDT account established by the town for participation in the MWRA program.
- (2) Indicates estimated project costs are final.
- (3) Project scope was amended to include these projects since funding for construction of East Brook Interceptor Replacement was obtained under SRF program.
- (4) Grant amount for this project includes accrued interest of \$20,960.
- (5) Grant amount for this project includes accrued interest of \$6,250.

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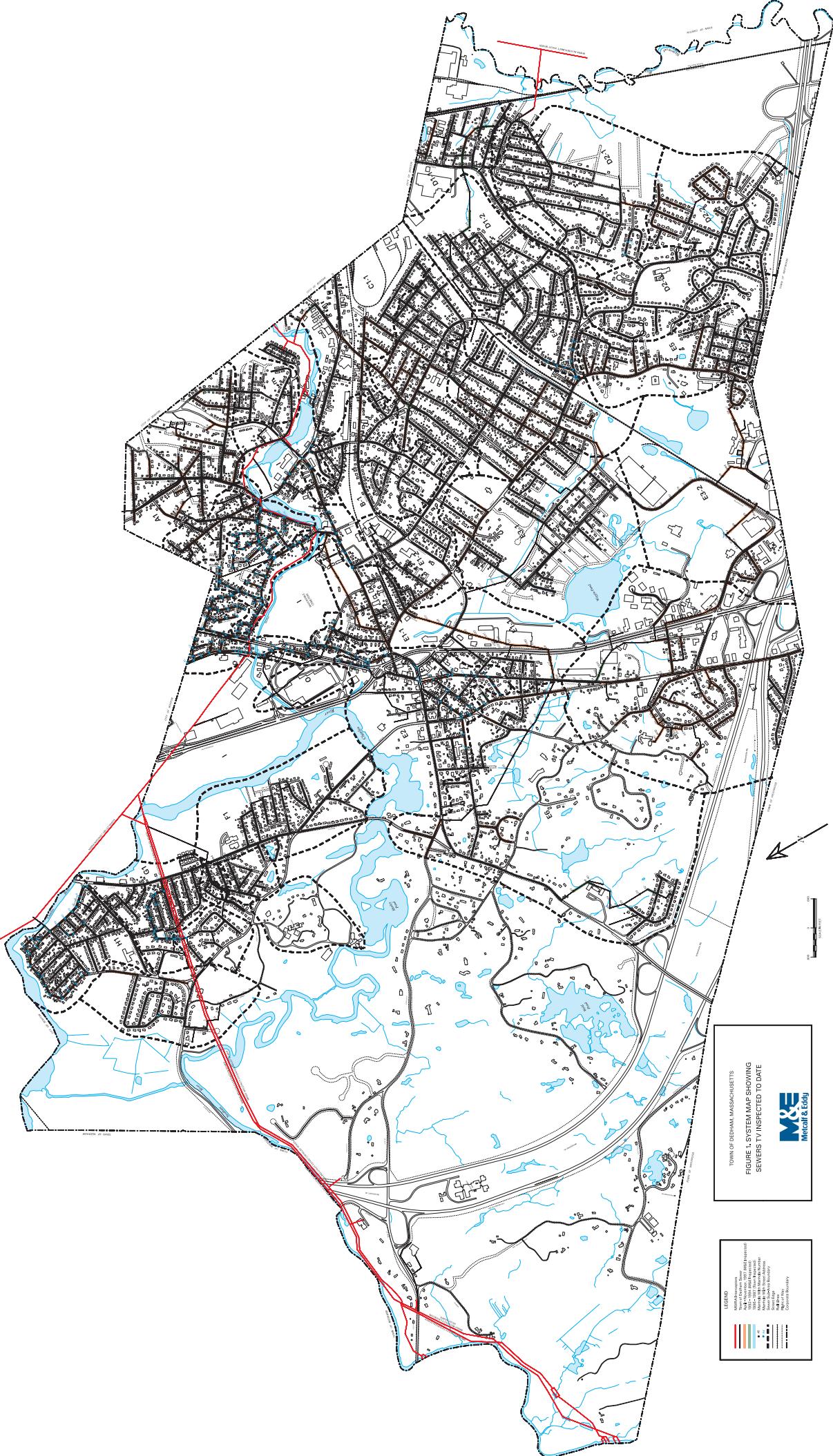
identification of I/I sources for subsequent rehabilitation. Once all the costs are identified, an implementation schedule should be developed to facilitate the appropriation of local funds.

Should you have any comments or questions regarding this letter report, please feel free to call.

Very truly yours,

Donald J. Chelton
Vice President
Metcalf & Eddy, Inc.

Attachments



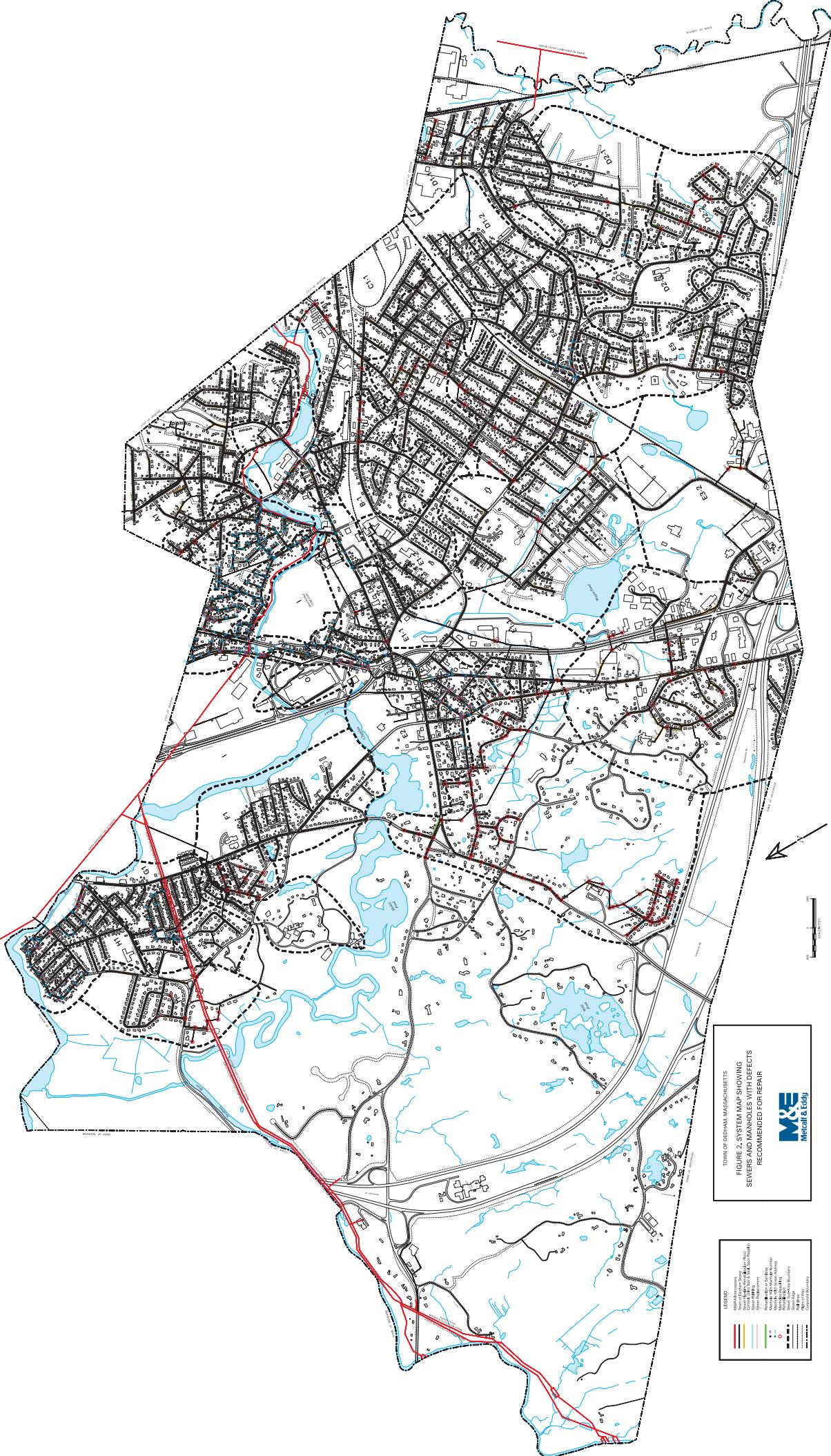


TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked
A1	33	32	Berlin Street	250	8	x	x			x		x	
A1	33	34	Berlin Street	119	8	x	x			x		x	100
A1	23	22	Bismark Street	212	8	x							
A1	22	20	Bismark Street	191	8								
A1	71	70	Cleveland Street	312	8	x	x			x		x	x
A1	70	69	Cleveland Street	130	8	x	x			x		x	
A1	69	68	Cleveland Street	127	8	x	x						
A1	68	67	Cleveland Street	218	8	x				x		x	
A1*	19	13	Colburn Street	380	8	x	x						10,080
A1*	20	19	Colburn Street	285	8				x	x			
A1	21	20	Colburn Street	119	8	x	x			x		x	
A1*	35	15	Colburn Street	373	8	x	x						1,440
A1	35	47	Colburn Street	142	8	x	x			x		x	
A1	47	48	Colburn Street	271	8	x	x			x		x	400
A1	48	49	Colburn Street	266	8	x	x			x		x	450
A1	163	193	Colburn Street	140	8								
A1	43	43A	Colonial Drive	155	8		x				3,000	x	
A1	43A	45	Colonial Drive	209	8		x					x	200
A1	45	46	Colonial Drive Easement	50	8		x					x	
A1	63	62	Dedham Boulevard	133	8		x					x	1,400
A1	62	61	Dedham Boulevard	270	8		x					x	500
A1	65	64	Dedham Blvd Easement	93	8								
A1	64	62	Dedham Blvd Easement	112	8		x						
A1	50	51	Emmett Avenue	219	8	x						x	
A1	51	49	Emmett Avenue	425	8	x	x			x		x	100
A1	28	29	Forest Street	111	8					x			
A1	59B	59A	Garfield Road	142	8								
A1	59A	59	Garfield Road	49	8								
A1	59	58	Garfield Road	210	8	x	x						
A1	58	57	Garfield Road	252	8	x	x					x	100
A1	57	56	Garfield Road	229	8	x						x	100
A1*	56	55	Garfield Road	250	8	x	x				5,760	x	
A1*	36	35	Greenhood Street	334	8	x	x					x	4,320
A1*	37	35	Greenhood Street	361	8	x				x			2,880
A1*	38	37	Greenhood Street	14	8					x			
A1	40	40A	Greenhood Street	245	8	x	x					x	350
A1	40A	39	Greenhood Street	70	8	x	x					x	
A1	39	38	Greenhood Street	150	8	x	x					x	
A1	76	77	Harding Terrace	120	8	x	x					x	100
A1	76	75	Harding Terrace	134	8	x	x					x	

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage Roots	Pipe Services		Est. Leak (gpd)
										Break-in Service Conn.	Broken/ Cracked Roots	
A1	75	74	Harding Terrace	213	8	x	x	x	x	x	x	1,500
A1	74	67	Harding Terrace	123	8		x		x	x	x	
A1	67	66	Harding Terrace	270	8	x	x	x	x	x	x	
A1	66	61	Harding Terrace	103	8	x				x		
A1*	61	60	Harding Terrace	147	8							
A1*	60	55	Harding Terrace	277	8		x		x	x		
A1*	55	53	Harding Terrace	146	8	x						
A1*	53	52	Harding Terrace	298	8		x		x	x		
A1*	52	48	Harding Terrace	272	8	x			x	x		1,440
A1*	25	24	Hyde Park Street	39	8				x			4,320
A1*	26	25	Hyde Park Street	125	8		x		x			
A1	25	14	Hyde Park Street	138	8	x	x	x	x			
A1*	14	13	Hyde Park Street	20	8							
A1*	13	15	Hyde Park Street	14	8							
A1	71	73	Leonard Street	98	8	x	x	x	x	x	x	
A1	75	78	Leonard Street	203	8	x	x	x	x			
A1*	78	79	Leonard Street	235	8		x			x		
A1	79	80	Leonard Street	115	8	x	x	x	x	x	x	
A1	16	15	Meadow Street	200	8	x	x	x	x			
A1	54	53	Stafford Street	240	8	x	x	x	x	x	x	250
A1	44	43	Thomas Street	112	8	x						
A1	42	43	Thomas Street	213	8							
A1	41	42	Thomas Street	156	8							
A1	17	16	Vito Way	265	8	x	x	x	x	x	x	
A1	1	1B	Ware Street	121	8							
A1	1B	1A	Ware Street	94	8							
A1	1	2	Ware Street	426	8	x	x	x	x	x	x	550
A1	2	3	Ware Street	224	8	x	x	x	x	x	x	100
A1	3	4	Ware Street	120	8	x	x	x	x	x	x	
A1	8	9	Ware Street	175	8	x	x	x	x	x	x	
A1	31	30	Whitelhall Street	329	8	x	x	x	x	x	x	
A1	30	14	Whitelhall Street	180	8	x	x	x	x	x	x	
A1	11	12	Whitelhall Street	356	8	x	x	x	x	x	x	50
A1	12	13	Whitelhall Street	172	8	x		x	x			
A1*	31	32	Whitelhall Street	118	8			x	x			1,440
b*	13	8	Kiely Road	233	8	x	x	x	x			6,550
b*	4	8	Moreland Avenue	90	8	x	x	x	x			720
B1	3	4	Zoar Avenue	270	8							6,260
B1	30	29	Whiting Avenue	131	8	x	x	x	x	x	x	
B1	29	28	Whiting Avenue	153	8	x						

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked
B1	28	27	Whiting Avenue	201	8							x	
B1	27	26	Whiting Avenue	251	8							x	
B1	26	25	Whiting Avenue	260	8	x	x				2,880	x	
C1-1*	49	47	Ashcroft Street	240	8	x	x					x	
C1-1	36	34	Blossom Street	351	8	x	x					x	x
C1-1	34	33	Blossom Street	263	8	x	x					x	x
C1-1*	3	2	Paradise Lane	232	18	x	x		x			5,800	
C1-1	2	1	Paradise Lane	222	18	x	x		x			2,900	x
C1-1	42	41	Quincy Avenue	131	8	x	x		x			x	x
C1-1	41	40	Quincy Avenue	152	8	x	x		x			x	x
C1-1	40	39	Quincy Avenue	151	8	x	x		x			x	x
C1-1	39	37	Quincy Avenue	256	8	x	x		x			x	x
C1-1*	7	6	River Street	201	15	x	x		x				
C1-1*	6	5	River Street	79	15	x	x		x			2,880	x
C1-1*	5	4	River Street	129	15	x	x		x			1,440	
C1-1*	4	3	River Street	196	15	x						14,400	
C1-1	55	25	River Street	176	12	x	x					x	x
C1-1	25	24	River Street	268	15	x	x						
C1-1	24	23	River Street	201	15	x	x						
C1-1	23	8	River Street	203	15	x	x						x
C1-1	8	7	River Street	205	15	x	x					300	
C1-1	37	37B	Whiting Avenue	185	8	x	x		x			x	x
C1-1	37B	33	Whiting Avenue	217	8	x	x		x			x	x
C1-1	33	33B	Whiting Avenue	214	8	x	x		x			x	x
C1-1	33B	25A	Whiting Avenue	123	8				x			x	
C1-1	25A	25B	Whiting Avenue	16	8								
C1-1	25B	25C	Whiting Avenue	90	8								
C1-1	28	27	Whiting Avenue	193	8	x	x		x			x	x
C1-1	27	26	Whiting Avenue	227	8	x	x		x			x	x
C1-1	26	25	Whiting Avenue	227	8	x	x		x			x	x
C1-2	97	95	Alpine Street	258	8				x			x	x
C1-2*	79	78	Border Street	356	8	x	x		x			250	
C1-2	109	108	Cedar Street	180	8	x	x		x			x	x
C1-2	108	107	Cedar Street	184	8	x	x		x			2,880	x
C1-2	107	106	Cedar Street	189	8	x	x		x			x	750
C1-2*	106	105	Cedar Street	260	8	x	x		x			1,200	x
C1-2	105	104	Cedar Street	55	8	x	x		x			x	300
C1-2	131	130	Cedar Street	267	8								
C1-2	130	123	Cedar Street	319	8	x	x		x			x	x
C1-2	123	104	Cedar Street	331	8	x	x		x			x	

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Est. Leak (gpd)	Services		Est. Leak (gpd)
											Roots	Break-in Service Conn.	
C1-2	60	59	Dale Street	218	8	x	x			x	x	x	
C1-2	59	58	Dale Street	310	8	x	x			x	x	x	
C1-2	58	57	Dale Street	103	8		x			x	x	x	
C1-2	57	56	Dale Street	152	8	x	x			x	x	x	
C1-2	101	100	Oakdale Avenue	204	8	x	x			x	x	x	
C1-2	100	97	Oakdale Avenue	238	8	x	x			x	x	x	
C1-2	99	98	Oakdale Avenue	192	6	x	x			x	x	x	
C1-2	98	97	Oakdale Avenue	196	8	x	x			x	x	x	
C1-2	63	62	Quincy Avenue	253	8	x	x			x	x	x	7,200
C1-2	62	61	Quincy Avenue	245	8	x	x			x	x	x	1,440
C1-2	61	60	Quincy Avenue	245	8	x	x			x	x	x	
C1-2*	77	75	Reed Street	191	8		x			x	x	x	2,880
C1-2*	75	72	Reed Street	342	8		x			x	x	x	2,880
C1-2	56	55	River Street	313	12		x			x	x	x	
C1-2*	104	103	River Street	123	8	x	x			x	x	x	4,320
C1-2	103	102	River Street	128	8	x	x			x	x	x	
C1-2	102	93	River Street	292	8	x	x			x	x	x	
C1-2	93	92	River Street	272	8	x	x			x	x	x	
C1-2	92	56	River Street	99	8		x			x	x	x	
C1-2*	116	115	Sanderson Avenue	204	8		x			x	x	x	
C1-2*	115	104	Sanderson Avenue	199	8		x			x	x	x	
C1-2	133	132	Shiretown Road	180	8	x	x			x	x	x	
C1-2	132	131	Shiretown Road	181	8		x			x	x	x	
C1-2	96	95	Winthrop Street	294	8	x	x			x	x	x	1,250
C1-2	95	94	Winthrop Street	219	8	x	x			x	x	x	300
C1-2	94	93	Winthrop Street	211	8		x			x	x	x	
DI-1*	83	85	Durham Road	148	8		x			x	x	x	
DI-1	89	90	Hooper Road	238	8	x	x			x	x	x	
DI-1	90	107	Hooper Road	241	8	x	x			x	x	x	100
DI-1*	107	108	Hooper Road Easement	167	15	x				x	x	x	1,440
DI-1*	108	112	Hooper Road Easement	274	15	x				x	x	x	21,600
DI-1*	112	113	Hooper Road	71	15	x	x			x	x	x	
DI-1*	113	114	Hooper Road	166	15	x	x			x	x	x	1,000
DI-1	106	104	Lakeside Avenue	157	8	x	x			x	x	x	
DI-1*	105	104	McDonald Street	80	8	x	x			x	x	x	
DI-1	104	103	McDonald Street	170	8	x	x			x	x	x	250
DI-1	103	101	McDonald Street	255	8		x			x	x	x	250
DI-1**	102	101	McDonald Street	294	8		x			x	x	x	
DI-1**	77	83	Sprague Street	210	8	x	x			x	x	x	1,000
DI-1*	77	87	Sprague Street Easement	242	15		x			x	x	x	

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Est. Leak (gpd)	Services	
											Roots	Break-in Service Conn.
D1-1*	87	89	Sprague Street Easement	185	15		x		x			
D1-1*	80	79	Sprague Street	199	8							
D1-1*	84	83	Sprague Street	140	8							
D1-1	135	133	Stoughton Road	155	8			x				
D1-1	135	136	Stoughton Road	138	8	x	x		x		x	x
D1-2*	57	56	Crane Street	156	10	x	x			8,640		
D1-2*	56	59	Crane Street ROW	147	10	x	x			3,024	x	
D1-2**	43	74	Paul Street ROW	520	12	x			x			
D1-2*	39	40	Poplar Street	201	10					4,320		
D1-2*	9	11	Turner Street	282	8				x			
D1-2*	17	18	Turner Street	319	8				x		x	
D2-1	179	179B	Colwell Drive	195	12	x	x					
D2-1	179B	180	Colwell Drive	212	12	x			x		x	50
D2-1	180	191	Colwell Drive	133	12	x			x		x	
D2-2	170	169	Calvin Road	212	8	x	x		x		x	
D2-2	146	145	Carol Drive	116	8	x			x		x	
D2-2	145	144	Carol Drive	79	8	x			x		x	
D2-2	144	143	Carol Drive	198	8	x	x		x		x	
D2-2	143	142	Carol Drive	300	8	x			x		x	3,000
D2-2	142	134	Carol Drive	113	8	x			x		x	1,500
D2-2	140	137	Carol Drive	273	8				x		x	
D2-2	137	136	Carol Drive	244	8	x	x		x		x	50
D2-2	136	135	Carol Drive	80	8	x	x		x		x	
D2-2	135	134	Carol Drive	287	8	x			x		x	
D2-2	141	140	Carol Drive	245	8				x		x	
D2-2	105	126	Colwell Drive	238	12	x	x			100		
D2-2	126	127	Colwell Drive	229	12	x	x			50		
D2-2	132	164	Colwell Drive	219	12	x			x		x	100
D2-2	164	165	Colwell Drive	169	12	x						
D2-2	165	166	Colwell Drive	185	12	x			x			
D2-2	166	167	Colwell Drive	120	12	x	x		x		x	
D2-2**	120	119	Quarry Road	194	8				x			
D2-2**	119	118	Quarry Road	206	8	x	x		x		x	
D2-2**	118	117	Quarry Road	53	8		x		x		x	500
D2-2	168	167	Scott Circle	242	8	x	x		x		x	
D2-2	169	168	Scott Circle	35	8	x	x					
D2-2	171	168	Scott Circle	243	8	x	x		x		x	325
D2-2	172	171	Scott Circle	311	8	x	x		x		x	300
D2-2	174	167	Scott Circle	234	8	x	x		x		x	
D2-2	175	174	Scott Circle	103	8	x						

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
D2-2	176	175	Scott Circle	221	8	x	x				x	x	
D2-2	177	176	Scott Circle	347	8	x	x				x	x	
D2-2	139	138	Wesley Street	222	8	x	x		x		x	x	x
D2-2	138	137	Wesley Street	221	8	x	x				x	x	
D2-3	82A	82	Stoughton Road	139	8	x	x		x		x	x	
D2-3	83	82A	Stoughton Road	78	8	x	x		x		x	x	100
D2-3	84	83	Stoughton Road	60	8						x	x	
D2-3	84A	84	Stoughton Road	141	8	x	x		x		x	x	150
D2-3	85	84A	Stoughton Road	164	8	x	x		x		x	x	
D2-3	86	85	Stoughton Road	94	8	x	x		x		x	x	
D2-3	87	86	Stoughton Road	129	8	x	x		x		x	x	100
E1-1	53	49	East Street	236	10	x	x		x		2,880	x	
E1-1	49	48	East Street	21	10								
E1-1	30	28	High Street	313	6								
E1-1	28	27	High Street	161	8								
E1-1	27	26	High Street	73	8								
E1-1	26	25	High Street	282	8	x	x		x				
E1-1	25	23	High Street	186	8								
E1-1	23	22	High Street	308	8								
E1-1	41	31	High Street	204	15	x	x		x		1,500	x	
E1-1	125	125B	LBI Memorial Park	285	24	x	x		x		18,100		
E1-1	125B	125C	LBI Memorial Park	270	24	x	x		x		2,880		
E1-1	125C	125D	LBI Memorial Park	291	24	x	x		x		27,400		
E1-1	125D	48	LBI Memorial Park	237	24	x	x		x		250		14,400
E1-1	15	14	LBI Brookdale Cemetery	444	24 x 36	x	x		x		4,800		
E1-1	14	9	LBI Brookdale Cemetery	293	24 x 36	x	x		x		3,000		
E1-1	9	2	LBI Brookdale Cemetery	234	24 x 36	x	x		x		3,100		
E1-1	22	21	LBI Churchill Place	128	24 x 36	x	x		x				
E1-1	21	19	LBI Churchill Place	295	24 x 36	x	x		x		7,700		
E1-1	19	17	LBI Churchill Place	303	24 x 36	x	x		x		9,900		
E1-1	17	15	LBI Dominic Court	359	24 x 36	x	x		x		3,100		
E1-1	48	44	LBI East Street	216	24	x	x		x		4,700		
E1-1	44	43	LBI East Street	254	24	x	x		x		21,700	x	15,100
E1-1	43	42	LBI East Street	246	24	x	x						
E1-1	42	31	LBI East Street	79	24	x	x						
E1-1	31	22	LBI High Street	277	24 x 36	x	x				12,280		
E1-1	1	2	LBI Maverick Street	229	24 x 36	x	x				800		
E1-1	1A	1B	LBI Maverick Street	250	18								
E1-1	1A	132A	LBI Petco Easement	180	18								
E1-1	132B			45	18								

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked
E1-1	132B	132C	LBI Petco Easement	97	18								
E1-1	132C	132D	LBI Petco Easement	193	18								
E1-1	132D	133	LBI Petco Easement	239	18	x		x	x		5,550		
E1-1	133	125	LBI Petco Easement	321	18	x		x	x		750		
E1-1	128	129	LBI Rt. 1 (N.B.)	290	18	x		x	x		2,000		
E1-1	129	130	LBI Rt. 1 (N.B.)	134	18	x		x	x		275		
E1-1	130	131	LBI Rt. 1 (N.B.)	328	18	x		x	x		1,700		
E1-1	131	132	LBI Rt. 1 (N.B.)	237	18	x		x	x		1,540		
E1-1	132	132A	LBI Rt. 1(N.B.)	94	18	x		x	x		375		
E1-1	127	128	LBI Rt. 1 Crossing	339	18	x		x	x		1,450		
E1-1	106	127	LBI Washington St. Eas.	291	18	x		x	x		3,400		
E1-2	61	60	East Street	124	8	x		x	x				
E1-2	60	60A	East Street	30	8	x		x	x				
E1-2	60A	59	East Street	120	8	x		x	x				
E1-2	59	58	East Street	215	8	x		x	x		x		
E1-2	58	57	East Street	153	10	x		x	x				
E1-2	57	54	East Street	278	10	x		x	x		x		
E1-2	54	53	East Street	56	10	x		x	x		x		
E2	17	74	Church Street	54	10	x		x	x				
E2	74	55	Church Street	254	10	x		x	x				
E2	55	46	Church Street	256	10	x		x	x				
E2	97	82	Court Street	188	8				x				
E2	82	68	Court Street	189	8				x				
E2	68	17	Court Street	176	8				x				
E2	302	310	Church Street	117	8				x				
E2	310	310B	East Street	399	8	x		x	x		300		
E2**	595	563	High Street	309	12				x	x	200		
E2	36	19	Marsh Street	212	6	x		x	x		2,000		
E2	19	494	Marsh Street	215	6	x		x	x				
E2	69	47	School Street	216	6	x		x	x				
E2	47	46	School Street	321	8	x		x	x		x		
E2	50	25	Village Avenue	291	8	x		x	x		x		
E2	25	17	Village Avenue	328	8	x		x	x		x		
E2	244	254	Washington Street	245	8	x		x	x				
E2	254	272	Washington Street	242	8	x		x	x		x		
E2	272	284	Washington Street	112	8	x		x	x		x		
E2	397	595	Washington Street	288	8	x		x	x		x		
E2	431	397	Washington Street	361	8	x		x	x				
E2	431A	431	Washington Street	52	8	x		x	x				
E2	449	431A	Washington Street	245	8	x		x	x		x		

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
E2	469	449	Washington Street	225	8	x	x		x	x	x	x	
E2	494	469	Washington Street	268	8	x	x		x	x	x	x	
E3-1*	138	137	Central Avenue	174	8	x	x						
E3-1*	144	143	Central Avenue	35	8	x	x						1,440
E3-1	173	174	East Street	226	8	x	x		x	x	x	x	50
E3-1	174	166	East Street	157	8	x	x		x	x	x	x	
E3-1	166	162	East Street	245	8	x	x					x	150
E3-1	155	154	East Street	83	6	x	x		x	x	x	x	
E3-1	154	156	East Street	228	8				x	x	x	x	
E3-1	156	157	East Street	212	8				x	x	x	x	
E3-1*	149	136	Jersey Street	210	8	x	x						
E3-1	167	166	Park Street	251	8	x	x		x	x	x	x	150
E3-1	164	163	Puritan Lane	229	8	x	x		x	x	x	x	50
E3-1	163	162	Puritan Lane	232	8	x	x		x	x	x	x	100
E3-1	88	180A	Rustcraft Road Easement	208	18								
E3-1	180	180A	Rustcraft Road Easement	194	18								
E3-1	172	173	Walnut Street	255	8	x	x		x	x	x	x	150
E3-1*	115	116	Wentworth Street	116	8	x	x		x	x	x	x	
E3-1*	116	117	Wentworth Street	249	8	x	x		x	x	x	x	1,440
E3-1**	142	141	West Jersey Street	231	8	x	x		x	x	x	x	
E3-1**	141	140	West Jersey Street	213	8	x	x		x	x	x	x	150
E3-1*	140	139	West Jersey Street	156	8	x	x						
E3-2	43	42A	Allied Drive	298	8				x	x	x	x	
E3-2	42	41	Allied Drive	135	10				x	x	x	x	
E3-2	41	40	Allied Drive	211	12				x	x	x	x	
E3-2	70	71	Allied Drive Easement	184	12				x	x	x	x	
E3-2	69	70	Allied Drive Easement	78	12				x	x	x	x	
E3-2	68	69	Allied Drive Easement	198	12				x	x	x	x	
E3-2	67	68	Allied Drive Easement	60	10				x	x	x	x	
E3-2	59	67	Allied Drive Easement	131	8				x	x	x	x	
E3-2	71	51	Allied Drive Easement	198	12				x	x	x	x	
E3-2	51	50A	Allied Drive Easement	60	12				x	x	x	x	
E3-2	50A	50	Allied Drive Easement	97	12				x	x	x	x	
E3-2	50	49	Allied Drive Easement	141	12				x	x	x	x	
E3-2	40	39A	Allied Drive Easement	90	12				x	x	x	x	
E3-2	39A	39	Allied Drive Easement	182	12				x	x	x	x	
E3-2	1	2	Elm Street	193	8	x	x		x	x	x	x	
E3-2	2	3	Elm Street	169	8	x	x		x	x	x	x	500
E3-2	3	4	Elm Street	169	8	x	x		x	x	x	x	
E3-2	4	5	Elm Street	169	8	x	x		x	x	x	x	1,000

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked
E3-2	6	5	Elm Street	49	8								
E3-2	7	6	Elm Street	198	8								
E3-2	8	7	Elm Street	253	8	x					x		
E3-2	9	8	Elm Street	301	8								
E3-2	14	13	Robinwood Road	52	8								
E3-2	13	12	Robinwood Road	270	8	x				x			500
E3-2	12	11	Robinwood Road	180	8	x				x			
E3-2	11	10	Robinwood Road	293	8					x			
E3-2	10	6	Robinwood Road	252	8	x					x		
E3-2	17	18	Rustcraft Road Easement	263	12						x		
E3-2	18	19	Rustcraft Road Easement	303	12						x		
E3-2	19	19A	Rustcraft Road Easement	161	12								
E3-2	19A	20	Rustcraft Road Easement	54	12								
E3-2	21	20	Rustcraft Road	102	12								
E3-2	20	22	Rustcraft Road	284	12	x							
E3-2	22	23	Rustcraft Road	195	12	x				x			
E3-2	23	24	Rustcraft Road	376	12								
E3-2	24	24A	Rustcraft Road	108	12								
E3-2	24A	25	Rustcraft Road	174	12								
E3-2	26	27	Rustcraft Road	162	12								
E3-2	27	28	Rustcraft Road	164	12								
E3-2	28	29	Rustcraft Road	177	12								
E3-2	29	30	Rustcraft Road	238	12								
E3-2	30	31	Rustcraft Road	237	12								
E3-2	31	32	Rustcraft Road	143	12								
E3-2	32	33	Rustcraft Road	95	12								
E3-2	33	34	Rustcraft Road	178	12								
E3-2	55	56	Willard Street	113	8						x		
E3-2	56	57	Willard Street	246	8	x					500		
E3-2	57	58	Willard Street	94	8	x					x		
E3-2	58	59	Willard Street	46	8						x		100
E3-2	59	60	Willard Street	48	8						x		
E3-2	60	61	Willard Street	75	8								
E3-2	61	62	Willard Street	72	8								
E3-2	62	63	Willard Street	151	8						x		
E3-2	63	64	Willard Street	64	8						x		
E3-2	64	65	Willard Street	72	8	x				x		250	
E3-2	65	66	Willard Street	122	8								
E4-1	81	82	Adams Street	267	8	x	x			x		250	x
E4-1*	8	9	Boulevard Road	269	8					x			x

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
E4-1	9	5	Boulevard Road	262	8	x	x		x	150	x	x	2,880
E4-1	3	4	East Street	234	8	x	x		x				
E4-1*	4	4A	East Street	18	8								
E4-1	4A	5	East Street	90	8	x							
E4-1	5	10	East Street	211	8								
E4-1	10	11	East Street	212	8	x	x						
E4-1	23	11	East Street	178	10								
E4-1	44	23	East Street	180	10	x					x		
E4-1	44	45	East Street	178	12	x	x						
E4-1*	82	79	East Street	76	12								
E4-1*	98	82	East Street	346	12	x	x				1,440		
E4-1	99	100	East Street	205	12								
E4-1	41	70	Elmwood Avenue	336	8	x					x	x	
E4-1	42	41	Elmwood Avenue	258	8	x					x	x	50
E4-1	92	91	Elmwood Avenue	242	8	x	x				x	x	
E4-1	93	96	Elmwood Avenue	175	8	x	x				x	x	
E4-1**	93	91	Elmwood Avenue	174	8	x	x				x	x	
E4-1**	67	66	Grant Avenue	282	8	x	x				x	x	
E4-1**	94	95	Grant Avenue	245	8	x	x				x	x	
E4-1**	95	96	Grant Avenue	247	8	x	x				x	x	
E4-1**	96	97	Grant Avenue	255	8	x					x		
E4-1	26	99	Greenwood Avenue	176	8								
E4-1	87	86	Hamilton Avenue	199	8						x	x	
E4-1	86	85	Hamilton Avenue	74	8						x	x	
E4-1	85	84	Hamilton Avenue	236	8	x	x				x	x	4,220
E4-1	84	79	Hamilton Avenue	270	8	x	x				x	x	
E4-1*	62	68	Jefferson Street	221	8						150		
E4-1*	68	69	Jefferson Street	210	8	x					4,320	x	
E4-1*	69	70	Jefferson Street	210	8								
E4-1	70	71	Jefferson Street	212	8	x							
E4-1	71	72	Jefferson Street	212	8	x							
E4-1	72	46	Jefferson Street	213	8	x	x				x	x	1,000
E4-1*	25	24	Madison Street	285	8	x	x				1,440	x	250
E4-1	26	24	Madison Street	167	8	x	x				500	x	500
E4-1	33	34	Madison Street	251	8	x	x				x	x	300
E4-1	34	35	Madison Street	234	8	x	x				x	x	400
E4-1	35	36	Madison Street	221	8								
E4-1	39	40	Madison Street	291	8								
E4-1	40	41	Madison Street	293	8	x	x				2,930	x	2,880
E4-1	41	43	Madison Street	323	8	x	x				50	x	1,440

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked
E4-1	43	44	Madison Street	322	8	x	x	x	x	x	x	x	x
E4-1	14	15	Monroe Street	226	8	x	x	x	x	x	x	x	x
E4-1	15	16	Monroe Street	228	8	x	x	x	x	x	x	x	x
E4-1	13	12	Monroe Street	180	8	x	x	x	x	x	x	x	x
E4-1	22	11	Monroe Street	273	8	x	x	x	x	x	250	x	x
E4-1	37	36	Mt. Vernon Street	120	8	x	x	x	x	x	x	x	x
E4-1	46	73	Rustcraft Road	220	18	x	x	x	x	x	x	x	x
E4-1	73	77	Rustcraft Road	192	18	x	x	x	x	x	x	x	100
E4-1	77	77A	Rustcraft Road	200	18	x	x	x	x	x	x	x	x
E4-1	77A	77B	Rustcraft Road	254	18	x	x	x	x	x	1,440	x	x
E4-1	77B	180	Rustcraft Road	312	18	x	x	x	x	x	600	x	x
E4-1	2	3	Sanderson Avenue	313	8	x	x	x	x	x	x	x	x
E4-2	414	425	Cedar Street	199	8	x	x	x	x	x	x	x	x
E4-2	425	441	Cedar Street	175	8	x	x	x	x	x	x	x	x
E4-2	441	455	Cedar Street	171	8	x	x	x	x	x	1,000	x	x
E4-2	32	455	Sprague Street	197	8	x	x	x	x	x	x	x	x
E4-2	455	884	Sprague Street	103	12	x	x	x	x	x	x	x	x
E4-2	884	882	Sprague Street	104	12	x	x	x	x	x	x	x	x
E4-2	66	50	Sprague Street	247	8	x	x	x	x	x	x	x	x
E5*	22	21	Chester Avenue	268	8	x	x	x	x	x	x	x	x
E5	1 (901)	2 (898)	East Street	163	12	x	x	x	x	x	x	x	x
E5	2 (898)	3 (911)	East Street	51	12	x	x	x	x	x	x	x	x
E5	3 (911)	4 (934)	East Street	263	12	x	x	x	x	x	x	x	x
E5	4 (934)	5 (938)	East Street	109	12	x	x	x	x	x	x	x	x
E5	5 (938)	6 (961)	East Street	213	12	x	x	x	x	x	x	x	x
E5	6 (965)	7 (976)	East Street	201	12	x	x	x	x	x	335	x	x
E5	7 (976)	8 (990)	East Street	167	12	x	x	x	x	x	350	x	x
E5	8 (990)	9 (991)	East Street	86	12	x	x	x	x	x	x	x	x
E5	9 (990)	10 (1002)	East Street	177	12	x	x	x	x	x	x	x	x
E5	10 (1002)	11 (1010)	East Street	129	12	x	x	x	x	x	x	x	x
E5	11 (1010)	12 (1028)	East Street	126	12	x	x	x	x	x	x	x	x
E5	12 (1028)	3 (-1031)	East Street	127	12	x	x	x	x	x	x	x	x
E5	13 (1031)	4 (1044)	East Street	126	12	x	x	x	x	x	x	x	x
E5	14 (1044)	15(1069)	East Street	262	12	x	x	x	x	x	x	x	x
E5	15 (1069)	16 (1077)	East Street	98	12	x	x	x	x	x	x	x	x
E5	16 (1077)	17 (1085)	East Street	79	12	x	x	x	x	x	x	x	x
E5	17 (1085)	18 (1102)	East Street	246	12	x	x	x	x	x	x	x	x
E5	18 (1102)	19 (1106)	East Street	27	12	x	x	x	x	x	x	x	x
E5	19 (1106)	20 (1115)	East Street	209	12	x	x	x	x	x	x	x	x
E5	20 (1115)	21 (1130)	East Street	270	12	x	x	x	x	x	x	x	x

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
E5	21 (1130)	22 (1142)	East Street	130	12	x	x	x	x	x	x	x	x
E5	22 (1142)	23 (1154)	East Street	172	12		x	x	x	x	x	x	x
E5	23 (1154)	24 (1188)	East Street	249	12		x	x	x	x	x	x	x
E5	3 (911)	27 (110)	Hermaine Avenue	151	8				x				
E5	27 (10)	28 (28)	Hermaine Avenue	154	8						x		20
E5	10 (1010)	33 (140)	Lamone Street	178	8				x				
E5	33 (14)	34 (24)	Lamone Street	154	8	x			x	x	100	x	250
E5	8 (990)	30 (24)	Preston Street	252	8						x	x	50
E5	30 (24)	31 (34)	Preston Street	141	8			x		x		x	
E5	31 (34)	32 (38)	Preston Street	117	8		x		x		x		150
E5	20 (1115)	38 (63)	Sidney Street	266	8		x		x		x		
E5	17 (1085)	35 (28)	Southgate	352	8	x	x	x	x	x	x	x	x
E5	35 (28)	36 (46)	Southgate	236	8	x	x	x	x	x	x	x	400
E5	36 (46)	37 (60)	Southgate	184	8		x		x				
E5	2 (899)	25 (18)	Top Hill Avenue	258	8						100	x	300
E5	25 (18)	26 (34)	Top Hill Avenue	145	8		x		x		x	x	x
E5	4 (934)	29 (28)	Upland Road	325	8		x		x		x	x	x
E5	22 (1142)	39 (22)	Winfield Street	235	10		x		x		x		x
E6*	138	132	Massachusetts Avenue	88	8	x			x				
E6*	132	124	Massachusetts Avenue	126	8	x	x	x	x		x	x	250
E6	82	77	Allendale Way	378	8	x	x	x	x		x	x	
E6*	96	97	Martin Bates Street	172	8		x		x		x		
E6*	10	32	Booth Road	224	8				x		720		
E6	63	62	Bridge Street	317	8	x	x	x	x		x		
E6	62	59	Bridge Street	304	8	x	x	x	x		x		200
E6	60	59	Common Street	255	8		x		x				4,320
E6	59	58	Common Street	368	8	x	x	x	x				
E6*	114	113	Newcourt Lane	248	8								
E6	113	112A	Court Street	202	8	x	x	x	x		x		
E6	112A	112	Court Street	283	8	x	x	x	x		x		
E6	112	109	Court Street	242	8	x	x	x	x		x		
E6	109	107	Court Street	325	8	x	x	x	x		x		
E6	107	106	Court Street	158	8	x	x	x	x		x		
E6	119	118	Court Street	303	8	x	x	x	x		x		
E6	118	105	Court Street	43	8		x		x				
E6*	43	44	High Street	139	8		x		x				
E6	100	99	Highland Street	253	8	x	x	x	x				
E6*	17	18	Robert Road	84	8	x	x	x	x		1,440		
E6*	38	39	ROW (School)	208	8	x	x	x	x				
E6*	39	42	ROW (High Street)	154	8								

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
E6	84	83	Wampatuck Road	213	8	x	x	x	x	x	1,000	x	x
E6	87	86	Wampatuck Road	196	8	x	x	x	x	x	x	x	x
E6	86	85	Wampatuck Road	173	8	x	x	x	x	x	x	x	x
E6	85	82	Wampatuck Road	174	8	x	x	x	x	x	x	x	700
E6	83	82	Wampatuck Road	243	8	x	x	x	x	x	x	x	100
E7	39	40	Anthony Lane	108	8	x	x	x	x	x	x	x	x
E7	40	41	Anthony Lane	88	8	x	x	x	x	x	x	x	x
E7	41	42	Anthony Lane	139	8	x	x	x	x	x	x	x	x
E7	41	43	Anthony Lane	380	8	x	x	x	x	x	x	x	x
E7	44	45	Chute Road	341	8	x	x	x	x	x	x	x	x
E7	45	46	Chute Road	167	8	x	x	x	x	x	x	x	x
E7	46	47	Chute Road	22	8	x	x	x	x	x	x	x	x
E7	48	47	Chute Road	200	8	x	x	x	x	x	x	x	400
E7	94	93	Chute Road	130	8	x	x	x	x	x	x	x	x
E7	93	92	Chute Road	214	8	x	x	x	x	x	x	x	x
E7	92	91	Chute Road	119	8	x	x	x	x	x	x	x	x
E7	91	90	Chute Road	93	8	x	x	x	x	x	x	x	x
E7	90	77	Chute Road	151	8	x	x	x	x	x	x	x	x
E7	138A	137A	Commercial Circle off Rt. 1	139	12								
E7	137A	136A	Commercial Circle off Rt. 1	194	12								
E7	136A	135A	Commercial Circle off Rt. 1	191	12								
E7	116	117	Elm Street	265	8	x	x	x	x	x	x	x	300
E7	117	118	Elm Street	184	8	x	x	x	x	x	x	x	
E7	119	120	Elm Street	91	10	x	x	x	x	x	x	x	200
E7*	120	121	Elm Street	148	10	x	x	x	x	x	x	x	
E7*	10	11	Fair Oak Road	171	8	x	x	x	x	x	x	x	
E7	88	87	Harmony Hill	63	8	x	x	x	x	x	x	x	
E7	89	88	Harmony Hill	113	8	x	x	x	x	x	x	x	
E7	87	85	Harmony Hill	202	8	x	x	x	x	x	x	x	
E7	74	73	Highland Street	251	8	x	x	x	x	x	x	x	
E7	73	72	Highland Street	95	8	x	x	x	x	x	x	x	
E7	72	71	Highland Street	53	8	x	x	x	x	x	x	x	
E7	71	70	Highland Street	155	8	x	x	x	x	x	x	x	
E7	70	69	Highland Street	104	8	x	x	x	x	x	x	x	
E7	69	68	Highland Street	85	8	x	x	x	x	x	x	x	
E7	68	62	Highland Street	48	8	x	x	x	x	x	x	x	
E7	62	75	Highland Street	16	8	x	x	x	x	x	x	x	
E7	76	77	Highland Street	213	8	x	x	x	x	x	x	x	100
E7	77	78	Highland Street	193	8	x	x	x	x	x	x	x	
E7	78	79	Highland Street	99	8	x	x	x	x	x	x	x	500

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services			
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked	Roots
E7	79	80	Highland Street	101	8	x	x	x	x	x				
E7	80	81	Highland Street	255	8	x	x	x	x	x	x			450
E7	82	81	Highland Street	65	8	x	x	x	x	x	x			
E7	65	66	Karen Pines	162	8									
E7	66	67	Karen Pines	195	8									
E7	115	114	Lee Terrace	197	8	x	x	x	x	x	x			
E7	38	37	Manning Road	224	8	x	x	x	x	x	x	x	x	550
E7	37	36A	Manning Road	45	8	x	x	x	x	x	x			
E7	36A	36	Manning Road	192	8	x	x	x	x	x	x	x	x	300
E7	36	35	Manning Road	214	8	x	x	x	x	x	x			
E7	35	34	Manning Road	109	8	x	x	x	x	x	x			
E7	34	33	Manning Road	129	8	x	x	x	x	x	x	x	x	
E7	33	32	Manning Road	143	8	x	x	x	x	x	x	x	x	500
E7	32	31	Manning Road	138	8	x	x	x	x	x	x			
E7	31	30	Manning Road	133	8	x	x	x	x	x	x			
E7	30	29	Manning Road	86	8	x	x	x	x	x	x	x	x	
E7	29	28	Manning Road	111	8	x	x	x	x	x	x	x	x	
E7	28	27	Manning Road	52	8	x	x	x	x	x	x			
E7	54	53	Pacella Drive	144	8	x	x	x	x	x	x			
E7	46	46A	Pacella Drive	203	8	x	x	x	x	x	x	x	x	750
E7	46A	51	Pacella Drive	84	8	x	x	x	x	x	x	x	x	
E7	51	52	Pacella Drive	21	8	x	x	x	x	x	x	x	x	
E7	52	53	Pacella Drive	95	8	x	x	x	x	x	x			
E7	50	49	Pacella Drive	197	8	x	x	x	x	x	x	x	x	500
E7	49	49A	Pacella Drive	166	8	x	x	x	x	x	x	x	x	
E7	49A	46	Pacella Drive	24	8	x	x	x	x	x	x			
E7	53	55	Pacella Drive	77	10	x	x	x	x	x	x			300
E7	55	55A	Pacella Drive	139	10	x	x	x	x	x	x	x	x	
E7	55A	56A	Pacella Drive Easement	82	10	x	x	x	x	x	x	x	x	
E7	56A	56	Pacella Drive Easement	24	10	x	x	x	x	x	x	x	x	
E7	61	60 A	Pacella Drive Easement	138	8									
E7	60 A	60	Pacella Drive Easement	129	8									
E7	59	60	Pacella Drive Easement	126	8	x	x	x	x	x	x	x	x	
E7	60	62 A	Pacella Drive Easement	102	8	x	x	x	x	x	x	x	x	
E7	62 A	62	Pacella Drive Easement	129	8	x	x	x	x	x	x			
E7	60C	60D	School Yard Easement	38	8									
E7	60 C	60 B	School Yard Easement	169	8									
E7	60 B	60 A	School Yard Easement	170	8	x	x	x	x	x	x	x	x	
E7	121	122A	US Route 1 (N.B.)	240	10	x	x	x	x	x	x	x	x	
E7	122A	122	US Route 1 (N.B.)	308	10	x	x	x	x	x	x	x	x	500

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		Est. Leak (gpd)
											Break-in Service Conn.	Broken/ Cracked Roots	
E7	122	123A	US Route 1 (N.B.)	187	10	x	x	x	x	x	x	x	
E7	123A	123	US Route 1 (N.B.)	249	10	x	x	x	x	x	x	x	
E7	18	9	Washington Street	263	8	x	x	x	x	x	x	x	
E7	9	19	Washington Street	85	8								
E7	19	20	Washington Street	8	8								
E7	20	20A	Washington Street	238	8								
E7	20A	21	Washington Street	61	8								
E7	21	22	Washington Street	220	8								
E7	22	23	Washington Street	183	6	x							
E7	23	24	Washington Street	112	8	x	x						
E7	24	25	Washington Street	244	8								
E7	25	26	Washington Street	35	8								
E7	26	27	Washington Street	185	8								
E7	27	97	Washington Street	186	8								
E7	97	98	Washington Street	200	8								
E7	98	99	Washington Street	214	8	x				x			6
E7	100	101	Washington Street	159	8	x	x						
E7	102	101	Washington Street	256	8					x			
E7	103	102	Washington Street	57	10	x				x			
E7	132	132A	Washington Street	236	8	x	x			x			
E7	132	133	Washington Street	182	8	x							
E7	133	134	Washington Street	193	8					x			
E7	134	135	Washington Street	190	8					x			
E7*	135	136	Washington Street	97	8					x			
E7*	136	137	Washington Street	248	12	x	x			x			10,080
E7*	137	138	Washington Street	129	12	x				x			1,440
E7*	130	130A	Washington Street Ease	146	12					x			
E7*	130A	130B	Washington Street Ease	168	12	x	x			x			200
E7*	130B	136	Washington Street Ease	145	12	x				x			2,600
E7	101	110	Wilson Avenue	222	8	x				x			
E7	110	110A	Wilson Avenue	46	10	x				x			
E7	110A	111	Wilson Avenue	200	10	x				x			
E7	111	112	Wilson Avenue	236	10	x				x			
E7*	112	124	Wilson Avenue	169	10	x	x			x			
E7	123	124	Wilson Avenue	145	10	x	x			x			
E7	112	125	Wilson Avenue Easement	255	12	x	x			x			
F1**	35	36	Bridge Street	197	12	x				x			1,000
F1**	36	37	Bridge Street	195	12	x				x			2,000
F1**	37	38	Bridge Street	265	12	x				x			2,000
F1**	38	39A	Bridge Street	258	12	x	x			x			1,200
													7,500

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Roots
F1*	39A	39	Bridge Street	225	12	x	x	x	x	x	7,500	x	x
f	37	20	Bonad Road	189	8								
f	20	14	Bonad Road	92	8	x	x	x	x	x		x	x
f	16	24	Lower East Street	171	8	x	x	x	x	x			
f	24	32	Lower East Street	175	8	x	x	x	x	x			
f	32	40	Lower East Street	67	8	x	x	x	x	x			
f	40	51	Lower East Street	160	8	x	x	x	x	x			
f	51	74	Lower East Street	314	8	x	x	x	x	x		x	
f	74	82	Lower East Street	66	8					x			
f	82	91	Lower East Street	149	8	x	x	x	x	x			
f	91	103	Lower East Street	47	8					x			
f	103	103A	Lower East Street	91	8	x	x	x	x	x			
f	13	51	Sumner Street	207	8	x	x	x	x	x		x	x
f	14	40	Willis Street	206	8	x	x	x	x	x		x	x
G1**	18	19	Marlboro Street	215	8					x			
G1**	123	115	Massachusetts Avenue	98	8	x	x	x	x	x		x	x
G1**	97	115	Massachusetts Avenue	260	8	x	x	x	x	x		x	x
G1**	97	86	Massachusetts Avenue	148	8					x			
G1**	86	78	Massachusetts Avenue	20	8	x	x	x	x	x		x	x
G1**	78	61	Massachusetts Avenue	237	8	x	x	x	x	x		x	x
G1**	61	41	Massachusetts Avenue	251	8					x		x	x
G1**	41	19	Massachusetts Avenue	299	8	x	x	x	x	x		x	x
G1**	13	19	Massachusetts Avenue	41	8					x			
G1	6	13	Massachusetts Avenue	193	8					x		x	x
g1	44	30	Brookdale Avenue	158	8	x	x	x	x	x		x	x
g1	30	20	Brookdale Avenue	193	8	x	x	x	x	x		x	x
g1	20	233	Brookdale Avenue	165	8	x	x	x	x	x		x	x
g1	307	272	East Street	227	6	x	x	x	x	x		x	x
g1	272	250	East Street	233	8	x	x	x	x	x		x	x
g1	250	223	East Street	263	8	x	x	x	x	x		x	x
g1	219	223	East Street	181	8	x	x	x	x	x		x	x
g1	201	219	East Street	175	8	x	x	x	x	x		x	x
g1	154	153	Washington Street	197	8	x	x	x	x	x		x	x
g2	153	125	Eastbrook Road	109	8	x	x	x	x	x		x	x
g2	125	20	Eastbrook Road	179	8	x	x	x	x	x		x	x
g2	20B	20	Eastbrook Road	55	8	x	x	x	x	x		x	x
g2	20B	21	Eastbrook Road	88	8	x	x	x	x	x		x	x
g2	21	103A	Lower East Street	156	8	x	x	x	x	x		x	x
g2	190	198	Washington Street	167	8	x	x	x	x	x		x	x
h	58	24	Oak Street	209	8					x		x	x

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Est. Leak (gpd)	Services		Est. Leak (gpd)
											Roots	Break-in Service Conn.	
h	24	12	Oak Street	226	8	x	x	x	x	x	x	x	
h	82	68	Oak Street	186	8	x	x	x	x	x	x	x	
h	68	54	Oak Street	188	8	x	x	x	x	x	x	x	
h	54	58	Oak Street	206	8	x	x	x	x	x	x	x	x
h	46	32	Ridge Avenue	169	8	x	x	x	x	x	x	x	x
h	32	18	Ridge Avenue	242	8	x	x	x	x	x	x	x	
h	18	24	Ridge Avenue	222	8	x	x	x	x	x	x	x	x
h	116	106	Schiller Road	165	8	x	x	x	x	x	x	x	x
h	106	92	Schiller Road	191	8	x	x	x	x	x	x	x	x
h	92	75	Schiller Road	197	8	x	x	x	x	x	x	x	x
h	75	58	Schiller Road	178	8	x	x	x	x	x	x	x	x
h	12	20	Washington Street	234	8	x	x	x	x	x	x	x	x
h	20	38	Washington Street	234	8	x	x	x	x	x	x	x	x
h	38	62	Washington Street	233	8	x	x	x	x	x	x	x	x
h	62	237	Washington Street	250	8	x	x	x	x	x	x	x	x
H1	41	31B	East Riverside Drive	112	8	x	x	x	x	x	x	x	x
H1	31B	19	East Riverside Drive	218	8	x	x	x	x	x	x	x	x
H1	19	7	East Riverside Drive	93	8	x	x	x	x	x	x	x	x
H1**	74	72	Pine Hill Road	109	8	x	x	x	x	x	x	x	x
H1**	72	51	Pine Hill Road	303	8	x	x	x	x	x	x	x	x
H1	262	282	Riverside Drive	202	8	x	x	x	x	x	x	x	x
H1	282	296	Riverside Drive	203	8	x	x	x	x	x	x	x	x
H1	296	300	Riverside Drive	139	8	x	x	x	x	x	x	x	x
H1	262	250	Riverside Drive	202	8	x	x	x	x	x	x	x	x
H1	250	227	Riverside Drive	266	8	x	x	x	x	x	x	x	300
H1	227	211	Riverside Drive	199	8	x	x	x	x	x	x	x	x
H1	211	197	Riverside Drive	197	8	x	x	x	x	x	x	x	x
H1	197	191	Riverside Drive	71	8	x	x	x	x	x	x	x	x
H1	191	171	Riverside Drive	225	8	x	x	x	x	x	x	x	x
H1	171	155	Riverside Drive	235	8	x	x	x	x	x	x	x	x
H1	155	134	Riverside Drive	192	8	x	x	x	x	x	x	x	x
H1	134	121	Riverside Drive	137	8	x	x	x	x	x	x	x	x
H1	121	106	Riverside Drive	287	8	x	x	x	x	x	x	x	x
H1	6	7	Riverside Drive	72	12	x	x	x	x	x	x	x	x
H1	7	24	Riverside Drive	217	12	x	x	x	x	x	x	x	x
H1	24	36	Riverside Drive	103	12	x	x	x	x	x	x	x	x
H1	36	40	Riverside Drive	115	12	x	x	x	x	x	x	x	x
H1	40	56	Riverside Drive	126	12	x	x	x	x	x	x	x	x
H1	56	60	Riverside Drive	205	12	x	x	x	x	x	x	x	x
H1	60	86	Riverside Drive	202	12	x	x	x	x	x	x	x	x

TABLE 1. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Est. Leak (gpd)	Services	
											Roots	Break-in Service Conn.
H1	86	106	Riverside Drive	217	12	x	x	x	x	500		
i	15	9	Columbia Terrace	102	8		x	x	x			
i	9	7	Columbia Terrace	81	8	x	x	x	x			
i	7	222	Columbia Terrace	213	8	x	x	x	x			
i	160	138	Curve Street	239	8	x	x	x	x			
i	138	122	Curve Street	194	8	x	x	x	x			
i	122	109	Curve Street	207	8	x	x	x	x			
i**	176	182	Curve Street	131	8	x	x	x	x			
i**	182	202	Curve Street	265	8	x	x	x	x			
i**	202	222	Curve Street	230	8	x	x	x	x			
i**	222	236	Curve Street	139	8	x	x	x	x			
i	236	237	Curve Street	151	8	x	x	x	x			
i	14	54	Evergreen Way	196	8							
i	14	138	Harvey Drive	174	8	x	x	x	x			
i	25	160	Hitchens Drive	298	8	x	x	x	x			
i	9	130	Lilac Lane	190	8	x	x	x	x			
i	6	34	Maverick Street	342	8	x	x	x	x			
i	34	45	Maverick Street	219	8	x	x	x	x			
i	45	54	Maverick Street	48	8	x	x	x	x			
i	54	65	Maverick Street	170	8	x	x	x	x			
i	88	34	Oak Street	151	8	x	x	x	x			
i	34	114	Oak Street	189	8	x	x	x	x			
i	114	130	Oak Street	198	8	x	x	x	x			
i	130	176	Oak Street	120	8	x	x	x	x			
i	24	32	Belpnap Street	333	6	x	x	x	x			
i	315	291	Colburn Street	243	8	x	x	x	x			
i	291	275	Colburn Street	254	8	x	x	x	x			
i	275	275B	Colburn Street	76	8	x	x	x	x			
i	275B	245	Colburn Street	230	8	x	x	x	x			
i	245	48	Colburn Street	227	8	x	x	x	x			
i	98	16	Curve Street	101	8							
i	16	83	Curve Street	106	8	x	x	x	x			
i	83	73	Curve Street	161	8	x	x	x	x			
i	73	66	Curve Street	50	8	x	x	x	x			
i	66	52	Curve Street	153	8	x	x	x	x			
i	52	34	Curve Street	210	8	x	x	x	x			
i	34	32	Curve Street	54	8	x	x	x	x			
i	32	48	Curve Street	243	8	x	x	x	x			
i	48	223A	Curve Street	36	8							
i	223A	223	Curve Street	136	8	x	x	x	x			
											x	300

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Roots	Services		
											Est. Leak (gpd)	Break-in Service Conn.	Broken/ Cracked Roots
j	9	275	Denmark Street	157	8	x	x	x	x	x	1,500	x	x
j	18	9	Denmark Street	99	8	x	x	x	x	x	x	x	x
j	90	60	Gaffney Road	217	8								
j	14	30	Gaffney Road	233	8								
j	13	42	Gould Street	266	8	x	x	x	x	x	x	x	750
j	22	16	Hirsch Terrace	91	8	x	x	x	x	x	x	x	x
j	90	22	Hirsch Terrace	176	8	x	x	x	x	x	x	x	x
j	16	52	Mt. Hope Street	192	8	x	x	x	x	x	x	x	x
j	37	52	Mt. Hope Street	170	8	x	x	x	x	x	x	x	300
j	52	59	Mt. Hope Street	109	8	x	x	x	x	x	x	x	x
j	59	67	Mt. Hope Street	123	8	x	x	x	x	x	x	x	x
j	67	85	Mt. Hope Street	162	8	x	x	x	x	x	x	x	x
j	85	66	Mt. Hope Street	206	8	x	x	x	x	x	x	x	x
j	27	16	Mt. Hope Street	149	8	x	x	x	x	x	x	x	x
j**	7	97	Nancy Road	205	8	x	x	x	x	x	x	x	x
j	2	37	Raven Hill	126	8	x	x	x	x	x	x	x	x
j**	115	103	Sunset Avenue	143	10	x	x	x	x	x	x	x	x
j**	81	90	Sunset Avenue	95	10	x	x	x	x	x	x	x	x
j**	90	103	Sunset Avenue	165	10	x	x	x	x	x	x	x	x
j**	103	7	Sunset Avenue	75	10	x	x	x	x	x	x	x	x
j	42	30	Waldo Street	56	8	x	x	x	x	x	x	x	x
j	30	20	Waldo Street	200	8	x	x	x	x	x	x	x	x
j	20	34	Waldo Street	200	8	x	x	x	x	x	x	x	x
J1*	30	31	Cunningham Road	252	8								
J1	187	167	Needham Street	233	8	x	x	x	x	x	x	x	x
J1	167	161	Needham Street	234	8	x	x	x	x	x	x	x	x
J1*	33	28	Rosemary Road	226	10	x	x	x	x	x	x	x	x
J1*	23	20	Rosemary Road	227	10	x	x	x	x	x	x	x	1,000
J1*	20	12	Rosemary Road	285	10	x	x	x	x	x	x	x	25,920
J1	42	41	Vine Rock Street	182	8								
J1	41	40	Vine Rock Street	232	8								
J1	40	39	Vine Rock Street	229	8								
k	2	3	Bussey Street	178	8	x	x	x	x	x	x	x	x
k	3	6	Bussey Street	177	8	x	x	x	x	x	x	x	x
k	6	8	Bussey Street	284	8	x	x	x	x	x	x	x	x
k	8	12	Bussey Street	22	8								
k	12	13	Bussey Street	162	8	x	x	x	x	x	x	x	x
k	13	14	Bussey Street	252	8	x	x	x	x	x	x	x	x
k	14	23	Bussey Street	180	8	x	x	x	x	x	x	x	2,880
k	23	25	Bussey Street	361	8	x	x	x	x	x	x	x	x

TABLE I. SUMMARY OF SEWER PIPELINE DEFECTS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Leak in Pipe	Offset/ Open Joint	Cracked/ Broken Pipe/Jt	Evidence of Leakage	Pipe		Services		
										Roots	Est. Leak (gpd)	Broken/ Cracked	Break-in Service Conn.	Roots
k	25	25A	Bussey Street	93	8	x	x	x	x	x	x	x	x	
k	25A	26	Bussey Street	203	8	x	x	x	x	x	x	x	x	
1	207	231	Bussey Street	192	8	x	x	x	x	x	x	x	x	
1	231	247	Bussey Street	209	8	x	x	x	x	x	x	x	x	1,440
1	247	14	Bussey Street	203	8	x	x	x	x	x	x	x	x	
1	366	350	High Street	116	8	x	x	x	x	x	x	x	x	
1	350	340	High Street	214	8	x	x	x	x	x	x	x	x	
1	340	329	High Street	231	8	x	x	x	x	x	x	x	x	
1	329	306	High Street	216	8	x	x	x	x	x	x	x	x	
1	1	209	High Street	242	8	x	x	x	x	x	x	x	x	
1	209	238	High Street	242	8	x	x	x	x	x	x	x	x	
1	238	306	High Street	242	8	x	x	x	x	x	x	x	x	1,440
1**	45	27	Milton Street	200	8	x	x	x	x	x	x	x	x	500
1**	27	27A	Milton Street	137	8	x	x	x	x	x	x	x	x	
n	1	2	High Street	299	8	x	x	x	x	x	x	x	x	
n	2	6	High Street	221	8	x	x	x	x	x	x	x	x	17,300
n*	6	7	High Street	126	8	x	x	x	x	x	x	x	x	1,440
n	7	10	High Street	92	8	x	x	x	x	x	x	x	x	750
n	10	14	High Street	273	8	x	x	x	x	x	x	x	x	
Totals:				146,495							416,825			143,182

Notes:

* Sewers previously television inspected by M&E between 1992-1994

** Sewers television inspected by Araco under separate contract to the town

TABLE 2. SUMMARY OF SEWERS NOT FULLY INSPECTED

Sewer Subarea	From MH	To MH	Street Name	Reason Not Inspected
A1	8	10	Whitehall Street	Root blockage
A1	10	11	Whitehall Street	Protruding break in service connection
A1	33	32	Berlin Street	Patchwork around service & slope change in pipe
D1	--	--	Tyler Road	Schedule did not permit
D1	--	--	Sherman Road	Schedule did not permit
E1-1	1A	1B	LBI Maverick Street	Videotape incomplete - should be retelevised
E2 ^(*)	595	563	High Street	Videotape incomplete - should be retelevised
E3-1	38	72	Central Avenue	Heavy flow/debris
E3-1 ^(*)	72	73	Central Avenue	Videotape incomplete - should be retelevised
E3-1	72	88	McKinley Street	Heavy flow/debris
E3-1	136	175	Jersey Street	Surcharged conditions
E3-1	176	177	Jersey Street	Surcharged conditions
E3-2	15	5	Elm to Rustcraft Easement	Pipe Collapse
E3-2	42A	41	Allied Drive	No access due to buried manhole
E3-2	50	49	Allied Drive Easement	Videotape incomplete - should be retelevised
E4-1	37	36	Mt. Vernon Street	Protruding service connection and limited access due to buried manhole
E4-1	84	83	Glenway	Pipe inaccessible due to severe offset
E4-1 ^(*)	93	91	Elmwood Avenue	Videotape incomplete - should be retelevised
E5	--	12	Norwich Street	No access due to buried manhole
E6	33	29	Robert Road ROW	Condition of manhole limits access
E6	120	104	Highland Street ROW	Surcharged conditions
E7	75	76	Highland Street	Videotape incomplete - should be retelevised
E7	99	100	Washington Street	Pipe inaccessible due to severe offset
E7	111	112	Wilson Avenue - Rte 1 Crossing	Pipe collapse - inspected 112' of 236'
E7	114	113	Lee Terrace	No access due to buried manhole
E7	123	124	Wilson Avenue - Rte 1 Crossing	Pipe collapse - inspected 126' of 145'
E7	125	130	Wilson Avenue to Dedham Plaza	Requires bucket cleaning
E7	135A	125	under US Rte 1 (N.B.)	Requires bucket cleaning
E7	140A	128	Crossing Rte 1 @ Dedham Plaza	Requires bucket cleaning
f	--	--	Winter Street	Schedule did not permit
G1 ^(*)	20	6	Riverview Street	Root blockage
G1 ^(*)	41	19	Massachusetts Avenue	Videotape incomplete - should be retelevised
i	176	160	Curve Street	Requires bucket cleaning

Note:

(*) Indicates work performed by Araco under separate contract to the town

**TABLE 3. SERVICE LATERALS SUSPECTED OF LEAKING
INFILTRATION IN PROPOSED TEST AREA**

Building/Home Address		
Echo Lane	108 High Street	305 High Street
Avery School	122 High Street	312 High Street
3 O'Neil Drive	128 High Street	331 High Street
5 O'Neil Drive	154 High Street	340 High Street
67 High Street	164 High Street	348 High Street
79 High Street	172 High Street	350 High Street
91 High Street	195 High Street	

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Prestressed or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
b	5	Brookside Avenue	1.8	B	1992		X		X	
b	7	Moreland Avenue	6.0	B	1992		X		X	
b	8	Kiely Road	7.3	B	1992	X	X			
b	9	Arcadia Avenue	4.5	B	1992		X			
b	11	Arcadia Parking Lot	2.5	B	1992					90
b	13	Kiely Road	7.5	B	1992		X			
b	14	Kiely Road	9.3	B	1992		X			
Br-1	25	Whiting Avenue	20.0	B	1988	X				
Br-1	26	Whiting Avenue	6.0	B	1988	X				
Br-1	27	Whiting Avenue	4.0	B	1988	X				
Br-1	28	Whiting Avenue	6.0	B	1988	X				
Br-1	29	Whiting Avenue	6.0	P	1988	X				
c	2	Hillcrest Avenue	6.0	B	1992					
c	3	Hillcrest Avenue	9.4	B	1992		X			
c	13	Hillcrest Avenue	8.8	P	1992					
Cl-1	1	Paradise Lane	10.0	B	1988	X	X			
Cl-1	2	Paradise Lane	6.0	B	1988	X				
Cl-1	3	River Street	12.0	B	1988	X	X			
Cl-1	5	River Street	8.0	P	1988	X				
Cl-1	6	River Street	(2)	(2)						
Cl-1	7	River Street	5.0	P	1988	X				
Cl-1	26	Whiting Avenue	8.0	B	1988	X				
Cl-2	95	Winthrop Street	8.0	B			X			
Cl-2	98	Oakdale Avenue	8.0	B			X			
Cl-2	100	Oakdale Avenue	7.0	B			X			
Cl-2	101	Oakdale Avenue	4.0	B			X			
Cl-2	131	Cedar Street	10.0	B			X			
Cl-2	133	Shirtown Road	8.0	B			X			
DI-1	101	McDonald Street	8.0	B	1988		X			
DI-1	102	McDonald Street	8.0	B	1988		X			
DI-1	103	McDonald Street	(2)	(2)						
DI-1	105	McDonald Street	6.0	B	1988		X			
D2-1	211	Bonham Road	3.0	B	1988		X			
D2-1	235	Carlisle Road	10.0	B	1988		X			
D2-2	x	Scott Circle	9.0	B			X			
D2-2	105	Colwell Drive	12.0	B			X			
D2-2	127	Colwell Drive	8.0	B	1988		X			
D2-2	132	Colwell Drive	12.0	B	1988		X			

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Precast or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
D2-2	134	Carol Drive	12.0	B	1988			X		
D2-2	134B	Carol Drive Easement	4.0	B	X					
D2-2	137	Carol Drive	4.0	B	1988	X		X		
D2-2	140	Carol Drive	3.0	B	1988	X				
D2-2	142	Carol Drive	10.0	B	1988	X				
D2-2	164	Colwell Drive	12.0	B	1988		X			
D2-2	176	Scott Circle	8.0	B	1988	X				
E1-1	1	Housing complex lot off of High St.	25.0	B	1988	X				
E1-1	17	Allen Lane	25.0	B	1988	X				
E1-1	31	High Street	15.0	B	1988	X				
E1-1	105	Washington Street	12.0	B	1988	X				
E1-1 ⁽¹⁾	132A	Washington Street Easement	(2)	(2)					X	
E2	17	Court Street	14.0	B				X		
E2	36	Marsh Street	8.0	B				X		
E2	46	School Street	12.0	B				X		
E2	46	Church Street	14.0	B				X		
E2	47	School Street	10.0	B				X		
E2	69	School Street	8.0	B				X		
E2	74	Church Street	14.0	B				X		
E2	244	Washington Street	12.0	B				X		
E2	254	Washington Street	12.0	B				X		
E2	272	Washington Street	10.0	B				X		
E2	284	Washington Street	10.0	B				X		
E2	494	Washington Street	12.0	B				X		
E3-1	88	McKinley Avenue	10.0	B	1988	X				
E3-1	89	McKinley Avenue		B	1988	X				
E3-1	90	McKinley Avenue		B	1988	X				
E3-1	113	Wentworth Street	10.0	B	1988	X				
E3-1	114	Wentworth Street	10.0	B	1988	X				
E3-1	130	Fairbanks Road Easement		B	1988	X				
E3-1	180A	Rustcraft Road Easement	(2)						X	
E3-2	39A	Allied Drive Easement	(2)	(2)					X	
E3-2	41	Allied Drive	(2)	(2)					X	
E4-1	1	Sanderson Avenue	8.5	B	1994	X				
E4-1	2	Sanderson Avenue	7.8	B	1994	X				
E4-1	3	Sanderson Avenue	4.5	B	1994	X				
E4-1	8	Boulevard Road	7.3	B	1994			X		180
E4-1	13	Monroe Street	7.6	B	1994			X	X	180

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Prestressed or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
E4-1	17	Mt. Vernon Street	8.5	B	1994			X	X	180
E4-1	19	Monroe Street	10.6	B	1994			X	X	180
E4-1	21	Monroe Street	8.1	B	1994				X	180
E4-1	24	Madison Street	7.0	B	1994					
E4-1	26	Madison Street	5.0	B	1994					
E4-1	31	Fales Road	6.0	B	1994				X	180
E4-1	68	Jefferson Street	10.7	B	1994				X	180
E4-2	455	Sprague Street	(2)	(2)				X		
E-5 ^(v)	21	East Street	(2)	(2)				X		
E-6	1	Booth Road	5.9	P	1992					
E-6	2	Booth Road	5.9	P	1992					
E-6	5	Booth Road	5.8	P	1992					
E-6	6	Booth Road	5.3	P	1992					
E-6	7	Booth Road	5.9	P	1992					
E-6	8	Booth Road	4.3	P	1992					
E-6	9	Booth Road	4.1	P	1992					
E-6	10	Booth Road	6.0	P	1992					
E-6	11	Booth Road	5.7	P	1992					
E-6	12	Booth Road	6.8	P	1992					
E-6	13	Ridley Road	4.5	P	1992					
E-6	15	Robert Road	7.9	P	1992					
E-6	16	Robert Road	6.0	P	1992					
E-6	18	Robert Road	7.5	P	1992					
E-6	19	Robert Road	6.7	P	1992					
E-6	20	Robert Road	5.1	P	1992					
E-6	22	Robert Road	5.0	P	1992					
E-6	23	Robert Road	4.9	P	1992					
E-6	24	Robert Road	5.3	P	1992					
E-6	25	Robert Road	5.3	P	1992					
E-6	26	Robert Road	6.3	P	1992					
E-6	27	Robert Road	4.9	P	1992					
E-6	28	Robert Road	5.3	P	1992					
E-6	29	Robert Road Easement	7.0	P	1992					
E-6	30	Robert Road Easement	6.0	P	1992					
E-6	33	Robert Road Easement	5.3	P	1992					
E-6	34	Robert Road Easement	4.7	P	1992					
E-6	34A	Robert Road Easement	4.5	P	1992					
E-6	35	Robert Road Easement	8.1	P	1992					

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Prestressed or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
E-6	37	Robert Road Easement	5.1	P	1992			X		90
E-6	40	School Parking Lot	7.9	P	1992		X			90
E-6	41	School Parking Lot	4.6	P	1992		X			
E-6	43	High Street	13.7	B	1992		X			
E-6	44	High Street		B	1992		X			
E-6	45	High Street	7.0	B	1992		X			
E-6	46	High Street	5.0	B	1992		X			
E-6	47	High Street	9.3	B	1992		X			
E-6	48	High Street	13.3	B	1992		X			
E-6	49	High Street	14.0	B	1992		X			
E-6	50	High Street	9.6	B	1992			X	X	
E-6	51	High Street	10.3	B	1992		X			
E-6	52	High Street	12.5	B	1992		X			
E-6	53	High Street	11.6	B	1992		X			
E-6	57	High Street	16.1	B	1992					180
E-6	58	High Street	15.0	B	1992					180
E-6	59	Common Street	18.3	B	1992		X			
E-6	60	Common Street	25.0	B	1992		X			
E-6	61	Common Street	8.8	B	1992		X			
E-6	62	Bridge Street	16.3	B	1992		X			
E-6	63	Bridge Street	4.5	B	1992		X			
E-6	65	High Street Easement	5.7	B	1992		X			
E-6	67	Village Avenue	10.0	B			X			
E-6	69	Village Avenue	9.0	B			X			
E-6	70	Village Avenue	8.8	B	1992		X			
E-6	71	Village Avenue	8.5	B	1992		X			
E-6	72	Village Avenue	8.0	B	1992		X			
E-6	73	Old Farm Road	8.1	B	1992		X			
E-6	74	Old Farm Road	8.3	B	1992		X			
E-6	75	Village Avenue	9.9	B	1992		X			
E-6	77	Village Avenue	9.0	B	1992		X			
E-6	78	Village Avenue	10.0	B	1992		X			
E-6	79	Village Avenue	8.3	B	1992		X			
E-6	80	Village Avenue	9.3	B	1992		X			
E-6	81	Village Avenue	9.6	B	1992		X			
E-6	82	Wampatuck Road	16.0	B			X			
E-6	83	Wampatuck Road	14.0	B			X			
E-6	84	Wampatuck Road	10.0	B			X	X	X	

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Prestressed or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
E-6	85	Wampatuck Road	14.0	B	X		X	X	X	
E-6	86	Wampatuck Road	12.0	B	X		X	X	X	
E-6	87	Wampatuck Road	8.0	B	X		X	X	X	
E-6	88	Chestnut Street	8.0	B	1992		X			
E-6	89	Chestnut Street	7.8	B	1992		X			
E-6	91	Bates Street	7.3	B	1992		X	X	X	90
E-6	96	Bates Street	5.4	B	1992		X	X	X	180
E-6	97	Highland Street	10.9	B	1992		X			
E-6	98	Highland Street	8.4	B	1992		X			
E-6	99	Highland Street	10.0	B			X	X	X	
E-6	100	Highland Street	7.4	B	1992		X	X	X	
E-6	101	Richards Street	10.6	B	1992		X			
E-6	103	Highland Street	7.8	B	1992		X	X	X	90
E-6	104	Highland Street	6.4	B	1992		X	X	X	
E-6	105	Court Street	10.0	B			X		X	
E-6	106	Court Street	10.0	B			X		X	
E-6	107	Court Street	10.0	B			X		X	
E-6	112	Court Street	10.0	B			X		X	
E-6	113	Court Street	10.0	B			X		X	
E-6	119	Court Street	3.0	B			X		X	
E-6	120	Court Street Easement	8.5	B	1992		X	X	X	1440
E-6	121	Court Street Easement	7.9	B	1992		X	X	X	1440
E-6	122	Court Street Easement	8.3	B	1992		X	X	X	1440
E-7	25	Washington Street	(2)	(2)	X					
E-7	39	Anthony Lane	(2)	(2)						
E-7 ⁽¹⁾	43	Anthony Lane Easement	(2)	(2)						
E-7 ⁽¹⁾	45	Chute Road	(2)	(2)						
E-7 ⁽¹⁾	46	Chute Road	(2)	(2)						
E-7	61	Pacella Drive	5.0	P	1988					
E-7	72	Highland Street	4.0	B	1988		X			
E-7	76	Highland Street	5.0	B	1988		X			
E-7	80	Highland Street	6.0	B	1988		X			
E-7	82	Highland Street	3.0	B	1988		X			
E-7 ⁽¹⁾	101	Washington Street	(2)	(2)						
E-7	110A	Wilson Avenue	4.0	B	1988		X			
E-7	111	Wilson Avenue	12.0	B	1988		X			
E-7	128	Washington Street Easement	10.0	B	1988		X	X	X	
E-7	139A	Driveway off Rt 1	9.0	B	1988		X			

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area	MH No.	Description of Location	MH Depth	Prestressed or Brick	Manhole Previously Inspected	Deteriorated/Missing			Defects Requiring Replacement	VI (gpd)
						Sediment/Debris Buildup	Defective Chimney	Loose/Misaligned F & C	Leaking Walls	
E-7	140A	Parking Lot off Rt 1	10.0	B	1988	X				X
E-7	140B	Parking Lot off Rt 1	3.0	B						X
f	51	Lower East Street	12.0	B						X
f	74	Lower East Street	15.0	B						
f	103	Lower East Street	25.0	B						
g ⁽¹⁾	20	Eastbrook Street	(2)	(2)						
g ⁽¹⁾	20B	Eastbrook Street	(2)	(2)						
h	12	Oak Street	10.0	B						
h	18	Ridge Avenue	12.0	B						
h	24	Oak Street	10.0	B						
h	58	Oak Street	10.0	B						
H1	7	Needham Street	12.0	B						
H1	24	Riverside Drive	12.0	B						
H1	36	Riverside Drive	(2)	(2)						
H1	40	Riverside Drive	(2)	(2)						
H1 ⁽¹⁾	106	Riverside Drive	(2)	(2)						
H1	134	Riverside Drive	8.0	B						
H1	197	Riverside Drive	(2)	(2)						
J	20	Waldo Street	6.0	B						
J	34	Waldo Street	8.0	B						
J1	6	Claybank Road Easement	7.3	P	1993					X
J1	7A	Claybank Road Easement	11.4	P	1993					X
J1	7	Claybank Road Easement	8.1	B	1993					X
J1	8	Claybank Road	5.1	B	1993					X
J1	9	Claybank Road	5.9	B	1993					X
J1	10	Needham Street	3.9	B	1993					X
J1	12	Needham Street	13.7	B	1993					X
J1	15	Pine Street	5.5	P	1993					X
J1	22	Cunningham Road	3.4	B	1993					X
J1	23	Lynch Avenue	15.2	B	1993					X
k	2	Bussey Street	8.0	B						
k	6	Bussey Street	12.0	B	1988					X
k	13	Bussey Street	14.0	B						X
l	14	Bussey Street	14.0	B						X
l	54	Maverick Street	8.0	P						X
l	207	Bussey Street	10.0	B						X
l	247	Bussey Street	10.0	B						X
		Total:			91	105	13	30	41	34
										19
										25
										13
										52,920

TABLE 4. SUMMARY OF MANHOLE DEFECTS

Sub-Area Note:	MH No.	Description of Location	MH Depth	Precast or Brick	Manhole Previously Inspected	Sediment/ Debris Buildup	Defective Chimney	Loose/ Misaligned	Defective F & C	Leaking Walls	Structural Defects	Deteriorated/Missing		Defects Requiring Replacement	VI (gpd)
												Bench	Invert		

- (1) The manhole is being replaced as part of the sewer rehabilitation. The cost for the new manhole is incurred under sewer rehabilitation.
 (2) Defect observed from review of TV inspection videotapes.

TABLE 5. BURIED MANHOLES IDENTIFIED DURING TV INSPECTION PROGRAM

Street Name	Sewer Subarea	Buried Manhole ^(*)	Approximate Location
Ware Street	A1	9	175' upstream of MH 8
Whiting Avenue	C1-1	25A	123' downstream of MH 33b
Whiting Avenue	C1-1	25B	16' downstream of MH 25a
Whiting Avenue	C1-1	37B	185' downstream of MH 37
Winthrop Street	C1-2	96	245' upstream of MH 95
Carol Drive	D2-2	145	79' upstream of MH 144
Laurie Lane	D2-2	178	308' upstream of MH 176
Stoughton Road	D2-3	82A	139' upstream of MH 82
Maverick Street	E1-1	2	229' upstream of MH 1 located in easement off Maverick Street
East Street	E3-1	155	150' upstream of MH 154
Rustcraft Road	E3-1	180A	194' downstream of MH 180
Allied Drive	E3-2	42A	298' downstream of MH 43
Mt. Vernon Street	E4-1	37 ⁽³⁾	120' upstream of MH 36
Rustcraft Road	E4-1	73	196' upstream of MH 77
Rustcraft Road	E4-1	77B	254' downstream of MH 77a
Top Hill Ave.	E-5	25	258' upstream of MH 2 on East St.
Common Street	E-6	58A	183' downstream of MH 59 at intersection of Bridge and Common
Commercial Circle	E-7	138A	139' upstream of MH 137a
Harmony Hill	E-7	88	113' downstream of MH 89
Harmony Hill	E-7	85	202' downstream of MH 87
Pacella Road	E-7	60A	138' downstream of MH 60a located in easement off Pacella Road
Route 1 North	E-7	122A	240' downstream of MH 121
Route 1 North	E-7	123A	187' downstream of MH 122
Washington Street	E-7	20 ⁽²⁾	8' downstream of MH 19
Washington Street	E-7	98	200' downstream of MH 97
East Street	g1	272 ⁽¹⁾	227' downstream of MH located in front of house # 307
Riverside Drive	H1	40 ⁽¹⁾	115' downstream of MH located in front of house # 36
Needham Street	J1	167 ⁽¹⁾	233' downstream of MH located in front of house # 187
Colburn Street	j	275B ⁽¹⁾	76' downstream of MH located in front of house # 275
Colburn Street	j	315 ⁽³⁾	243' upstream of MH located in front of house # 291
Curve Street	j	223A	36' downstream of MH 48 near Bussey Street

Notes:

(*) Unless indicated otherwise, manhole numbers are referenced to the town's current map of the existing system.

(1) Indicates manhole number is referenced to street address.

(2) MH19 is located in sidewalk and appears to have an 8" water main passing through just above the bench.

(3) These manholes were added to the table subsequent to M&E's letter to the town dated October 16, 1997.

TABLE 6. SEWERS REQUIRING HEAVY CLEANING PRIOR TO TELEVISION INSPECTION

Sewer Subarea	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Size (in)	Bucket Clean	Jet Clean
A1	13	16	Meadow Street	199	8	x	
A1	16	18	Meadow Street	213	8	x	
A1	17	16	Vito Way	264	8	x	
B1	12	24	Monroe to Madison Street	300 ⁽¹⁾	8	x	
C1-2	109	108	Cedar Street	180	8	x	
C1-2	67	64	Pratt Avenue	379	8		x
C1-2	133	132	Shiretown Road	181	8	x	x
C1-2	132	131	Shiretown Road	184	8	x	
D2-1	212	213	Bonham Road	254	12	x	x
D2-1	211	212	Bonham Road	500	12	x	x
D2-1	132	128	Colwell Drive	214	12	x	x
D2-1	128	127	Colwell Drive	30	12	x	x
D2-1	126	127	Colwell Drive	232	12	x	x
D2-1	105	126	Colwell Drive	243	12	x	
D2-2	176	178	Laurie Lane	308	8		x
D2-2	177	176	Scott Circle	340	8	x	
D2-2	176	175	Scott Circle	215	8	x	
D2-2	175	174	Scott Circle	103	8	x	
D2-2	174	173	Scott Circle	67	8	x	
D2-2	173	167	Scott Circle	162	8	x	
e	124	138	Massachusetts Avenue	214	8		x
e	-	-	Stivaletta Drive	650 ⁽¹⁾	8	x	x
e	-	-	Volk Road	900 ⁽¹⁾	8	x	x
E3-2	20	21	Rustcraft Road	103	12		x
E4-1	72	46	Jefferson Street	213	8	x	x
E6	63	62	Bridge Street	320	8	x	
E6	62	59	Bridge Street	311	8	x	
E6	59	58	Common Street	365	8	x	
f	32	51	Lower East Street	127	8	x	x
E7	117	116	Elm Street	270	8		x
G1	123	6	Massachusetts Avenue	1547	8		x
H1	134	155	Riverside Drive	200 ⁽¹⁾	8	x	x
Total				9788			

Note:

(1) Pipe length estimated based on scaling of sewer plan

TABLE 7. LOCATION OF TEST INSTALLATION OF SHORT CURED-IN-PLACE LINERS

Sewer Subarea	From MH	To MH	Street Name	Repair Length
A1	35	36	Greenhood Street	8'
C1-1	26	25	Whiting Avenue	5'
C1-1	28	27	Whiting Avenue	5'
D1-1	102	101	McDonald Street	5'
E4-2	414	425	Cedar Street	5'
E7	59	60	Pacella Drive	5'
f	51	74	Lower East Street	5'
h	18	24	Ridge Avenue	5'
h	46	32	Ridge Avenue	5'
i	54	65	Maverick Street	8'
j	16	83	Curve Street	5'
j	34	32	Curve Street	5'

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
A1	33	32	Berlin Street	250	8									250
A1	33	34	Berlin Street	119	8	119	119	1						
A1	23	22	Bismark Street	212	8				212	3				
A1	22	20	Bismark Street	191	8									
A1	71	70	Cleveland Street	312	8	312				3	1	1		
A1	70	69	Cleveland Street	130	8				130	1	1			
A1	69	68	Cleveland Street	127	8				127	1	2			
A1	68	67	Cleveland Street	218	8	218				218		1		
A1*	19	13	Colburn Street	380	8									380
A1*	20	19	Colburn Street	285	8	285				285	1			
A1	21	20	Colburn Street	119	8	119	119	4				2		
A1*	35	15	Colburn Street	373	8									373
A1	35	47	Colburn Street	142	8									142
A1	47	48	Colburn Street	271	8									271
A1	48	49	Colburn Street	266	8									266
A1	163	193	Colburn Street	140	8									140
A1	43	43A	Colonial Drive	155	8					155		1		
A1	43A	45	Colonial Drive	209	8	209	209					2		
A1	45	46	Colonial Drive Easement	50	8	50	50							
A1	63	62	Dedham Boulevard	133	8	133	133					1		
A1	62	61	Dedham Boulevard	270	8	270	270					1		
A1	65	64	Dedham Blvd Easement	93	8									
A1	64	62	Dedham Blvd Easement	112	8	112	112							
A1	50	51	Emmett Avenue	219	8	219	219	4				1		
A1	51	49	Emmett Avenue	425	8	425	425							
A1	28	29	Forest Street	111	8	111	111				3			
A1	59B	59A	Garfield Road	142	8									
A1	59A	59	Garfield Road	49	8									
A1	59	58	Garfield Road	210	8	210	5			2				
A1	58	57	Garfield Road	252	8	252	252	3			3			
A1	57	56	Garfield Road	229	8	229	229				2			
A1*	56	55	Garfield Road	250	8	250	250					1		
A1*	36	35	Greenhood Street	334	8									334
A1*	37	35	Greenhood Street	361	8	14	14							361
A1*	38	37	Greenhood Street	14	8									
A1	40	40A	Greenhood Street	245	8	245	245	13				1		
A1	40A	39	Greenhood Street	70	8	70	70	1				1		
A1	39	38	Greenhood Street	150	8	150	150	5			8	1		10
A1	76	77	Harding Terrace	120	8	120	120					1		
A1	76	75	Harding Terrace	134	8	134	134	2			8	1		

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
A1	75	74	Harding Terrace	213	8	213	213	2	6	3	1		
A1	74	67	Harding Terrace	123	8	123	123	1	6	1			
A1	67	66	Harding Terrace	270	8	270	270	4		1			
A1	66	61	Harding Terrace	103	8	103	103						
A1*	61	60	Harding Terrace	147	8								
A1*	60	55	Harding Terrace	277	8			3			1		
A1*	55	53	Harding Terrace	146	8				146				
A1*	53	52	Harding Terrace	298	8	298	298						
A1*	52	48	Harding Terrace	272	8							272	
A1*	25	24	Hyde Park Street	39	8								39
A1*	26	25	Hyde Park Street	125	8								125
A1	24	14	Hyde Park Street	138	8				138	3			10
A1*	14	13	Hyde Park Street	20	8								
A1*	13	15	Hyde Park Street	14	8								
A1	71	73	Leonard Street	98	8						1		
A1	75	78	Leonard Street	203	8				203	7			
A1*	78	79	Leonard Street	235	8								235
A1	79	80	Leonard Street	115	8				115	3			4
A1	16	15	Meadow Street	200	8				200	2			
A1	54	53	Stafford Street	240	8				240	2			2
A1	44	43	Thomas Street	112	8				112				
A1	42	43	Thomas Street	213	8								
A1	41	42	Thomas Street	156	8								
A1	17	16	Vito way	265	8				265	1			10
A1	1	1B	Ware Street	121	8								
A1	1B	1A	Ware Street	94	8								
A1	1	2	Ware Street	426	8				426	1			4
A1	2	3	Ware Street	224	8				224				
A1	3	4	Ware Street	120	8	120	120		120	2	1		10
A1	8	9	Ware Street	175	8	175	175	1		3			
A1	31	30	Whitehall Street	329	8				329	1			4
A1	30	14	Whitehall Street	180	8				180	1			3
A1	11	12	Whitehall Street	356	8				356	9	2		1
A1	12	13	Whitehall Street	172	8	172	172	1					
A1*	31	32	Whitehall Street	118	8	118	118						
b*	13	8	Kiely Road	233	8								233
b*	4	8	Moreland Avenue	90	8					90			
b*	3	4	Zoar Avenue	270	8								270
B1	30	29	Whiting Avenue	131	8						1		
B1	29	28	Whiting Avenue	153	8				1		2		

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
B1	28	27	Whiting Avenue	201	8					1	1			
B1	27	26	Whiting Avenue	251	8									
B1	26	25	Whiting Avenue	260	8			1						
C1-1*	49	47	Ashcroft Street	240	8									240
C1-1	36	34	Blossom Street	351	8			1		1	2	2		
C1-1	34	33	Blossom Street	263	8						1			
C1-1*	3	2	Paradise Lane	232	18									232
C1-1	2	1	Paradise Lane	222	18						1			222
C1-1	42	41	Quincy Avenue	131	8			131			1			
C1-1	41	40	Quincy Avenue	152	8			152	152		2			
C1-1	40	39	Quincy Avenue	151	8						1			
C1-1	39	37	Quincy Avenue	256	8		256		256			1		10
C1-1*	7	6	River Street	201	15			201	2					
C1-1*	6	5	River Street	79	15			79	1	11	2			
C1-1*	5	4	River Street	129	15					1				
C1-1*	4	3	River Street	196	15			196						
C1-1	55	25	River Street	176	12			176			1	1		
C1-1	25	24	River Street	268	15			268	1					10
C1-1	24	23	River Street	201	15			201	4	30		1		
C1-1	23	8	River Street	203	15							1	203	
C1-1	8	7	River Street	205	15								205	
C1-1	37	37B	Whiting Avenue	185	8									185
C1-1	37B	33	Whiting Avenue	217	8			217		1		1		
C1-1	33	33B	Whiting Avenue	214	8			214	214	1				50
C1-1	33B	25A	Whiting Avenue	123	8			123			1			
C1-1	25A	25B	Whiting Avenue	16	8									
C1-1	25B	25C	Whiting Avenue	90	8									
C1-1	28	27	Whiting Avenue	193	8									
C1-1	27	26	Whiting Avenue	227	8			227	3	15				227
C1-2	97	95	Alpine Street	258	8			258	258	1		3		193
C1-2*	79	78	Border Street	356	8									356
C1-2	109	108	Cedar Street	180	8			180	180	1	2			
C1-2	108	107	Cedar Street	184	8			184	1		1			60
C1-2	107	106	Cedar Street	189	8			189						
C1-2*	106	105	Cedar Street	260	8									260
C1-2	105	104	Cedar Street	55	8							55		
C1-2	131	130	Cedar Street	267	8			267	4					
C1-2	130	123	Cedar Street	319	8			319						
C1-2	123	104	Cedar Street	331	8			331	5	62				

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
C1-2	60	59	Dale Street	218	8		218	2					
C1-2	59	58	Dale Street	310	8		310	4		1			
C1-2	58	57	Dale Street	103	8		103					1	
C1-2	57	56	Dale Street	152	8		152						
C1-2	101	100	Oakdale Avenue	204	8		204		6			1	
C1-2	100	97	Oakdale Avenue	238	8		238		4			1	
C1-2	99	98	Oakdale Avenue	192	6								192
C1-2	98	97	Oakdale Avenue	196	8		196		5				
C1-2	63	62	Quincy Avenue	253	8		253		2				
C1-2	62	61	Quincy Avenue	245	8		245		3			1	
C1-2	61	60	Quincy Avenue	245	8		245		245			2	
C1-2*	77	75	Reed Street	191	8		191		191				
C1-2*	75	72	Reed Street	342	8								342
C1-2	56	55	River Street	313	12				313	2	22		
C1-2*	104	103	River Street	123	8								123
C1-2	103	102	River Street	128	8								
C1-2	102	93	River Street	292	8		292		5				128
C1-2	93	92	River Street	272	8		272		2			1	
C1-2	92	56	River Street	99	8		99		3			1	
C1-2*	116	115	Sanderson Avenue	204	8		204					2	
C1-2*	115	104	Sanderson Avenue	199	8								199
C1-2	133	132	Shiretown Road	180	8		180		1			1	
C1-2	132	131	Shiretown Road	181	8		181					1	
C1-2	96	95	Winthrop Street	294	8		294						
C1-2	95	94	Winthrop Street	219	8		219		2			2	
C1-2	94	93	Winthrop Street	211	8		211		5				
DI-1*	83	85	Durham Road	148	8								
DI-1	89	90	Hooper Road	238	8								
DI-1	90	107	Hooper Road	241	8								
DI-1*	107	108	Hooper Road Basement	167	15					9			
DI-1*	108	112	Hooper Road Basement	274	15					12			
DI-1*	112	113	Hooper Road	71	15								
DI-1*	113	114	Hooper Road	166	15		166						
DI-1	106	104	Lakeside Avenue	157	8						1		
DI-1*	105	104	McDonald Street	80	8		80						
DI-1	104	103	McDonald Street	170	8		170				11	2	
DI-1	103	101	McDonald Street	255	8		255		2		15	3	
DI-1	102	101	McDonald Street	294	8		294				24	2	
DI-1**	77	83	Sprague Street	210	8		210		2		1		
DI-1*	77	87	Sprague Street Easement	242	15				1		8		1

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Sewer Pipeline Rehabilitation			Rehabilitation of Services			Sewer Relining/Replacement		
						Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
D1-1*	87	89	Sprague Street Easement	185	15									
D1-1*	80	79	Sprague Street	199	8									
D1-1*	84	83	Sprague Street	140	8									
D1-1	135	133	Stoughton Road	155	8				2					
D1-1	135	136	Stoughton Road	138	8				138	1				
D1-2*	57	56	Crane Street	156	10									3
D1-2*	56	59	Crane Street ROW	147	10									156
D1-2*	43	74	Paul Street ROW	520	12									
D1-2*	39	40	Poplar Street	201	10									520
D1-2*	9	11	Turner Street	282	8				282					
D1-2*	17	18	Turner Street	319	8									
D2-1	179	179B	Colwell Drive	195	12				195	4				
D2-1	179B	180	Colwell Drive	212	12				212	1				
D2-1	180	191	Colwell Drive	133	12				133					
D2-2	170	169	Calvin Road	212	8				212					
D2-2	146	145	Carol Drive	116	8				116					
D2-2	145	144	Carol Drive	79	8				79					
D2-2	144	143	Carol Drive	198	8				198	1				
D2-2	143	142	Carol Drive	300	8				300	300				
D2-2	142	134	Carol Drive	113	8				113	113				
D2-2	140	137	Carol Drive	273	8				273	273				
D2-2	137	136	Carol Drive	244	8				244	244				
D2-2	136	135	Carol Drive	80	8				80	1				
D2-2	135	134	Carol Drive	287	8				287	287				
D2-2	141	140	Carol Drive	245	8				245	1				
D2-2	105	126	Colwell Drive	238	12				238	2				
D2-2	126	127	Colwell Drive	229	12				229	1				
D2-2	132	164	Colwell Drive	219	12				219					2
D2-2	164	165	Colwell Drive	169	12				169					
D2-2	165	166	Colwell Drive	185	12				185	1				
D2-2	166	167	Colwell Drive	120	12				120	3				
D2-2**	120	119	Quarry Road	194	8				194	1				
D2-2**	119	118	Quarry Road	206	8				206	2				
D2-2**	118	117	Quarry Road	53	8				53	1				
D2-2	168	167	Scott Circle	242	8				242	242				
D2-2	169	168	Scott Circle	35	8				35					
D2-2	171	168	Scott Circle	243	8				243	243				
D2-2	172	171	Scott Circle	311	8				311					
D2-2	174	167	Scott Circle	234	8				234	5				
D2-2	175	174	Scott Circle	103	8				103					10

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (#)	Localized Spot Repair (ft)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
D2-2	176	175	Scott Circle	221	8			221				1		10
D2-2	177	176	Scott Circle	347	8									
D2-2	139	138	Wesley Street	222	8		222	222	1		3	2		
D2-2	138	137	Wesley Street	221	8			215	2	6	3			
D2-3	82A	82	Stoughton Road	139	8		139	139						
D2-3	83	82A	Stoughton Road	78	8			78	1		1			
D2-3	84	83	Stoughton Road	60	8							2		
D2-3	84A	84	Stoughton Road	141	8		141	141	2			3		
D2-3	85	84A	Stoughton Road	164	8		164	164	1			2		
D2-3	86	85	Stoughton Road	94	8							5		
D2-3	87	86	Stoughton Road	129	8		129	129				2		
E1-1	53	49	East Street	236	10			236	2			1		
E1-1	49	48	East Street	21	10									
E1-1	30	28	High Street	313	6			313						
E1-1	28	27	High Street	161	8									
E1-1	27	26	High Street	73	8									
E1-1	26	25	High Street	282	8			282						
E1-1	25	23	High Street	186	8							1		
E1-1	23	22	High Street	308	8			308				1		
E1-1	41	31	High Street	204	15							1		
E1-1	125	125B	LBI Memorial Park	285	24							204		
E1-1	125B	125C	LBI Memorial Park	270	24								285	
E1-1	125C	125D	LBI Memorial Park	291	24								270	
E1-1	125D	48	LBI Memorial Park	237	24								291	
E1-1	15	14	LBI Brookdale Cemetery	44	24 x 36								237	
E1-1	14	9	LBI Brookdale Cemetery	293	24 x 36								444	
E1-1	9	2	LBI Brookdale Cemetery	234	24 x 36								293	
E1-1	22	21	LBI Churchill Place	128	24 x 36								234	
E1-1	21	19	LBI Churchill Place	295	24 x 36			295					128	
E1-1	19	17	LBI Churchill Place	303	24 x 36								295	
E1-1	17	15	LBI Dominic Court	359	24 x 36								303	
E1-1	48	44	LBI East Street	216	24								359	
E1-1	44	43	LBI East Street	254	24								216	
E1-1	43	42	LBI East Street	246	24								254	
E1-1	42	31	LBI East Street	79	24								246	
E1-1	31	22	LBI High Street	277	24 x 36								79	
E1-1	1	2	LBI Maverick Street	229	24 x 36								1	277
E1-1	1A	1A	LBI Maverick Street	250	18			250						229
E1-1	1B	LBI Maverick Street	180	18			180							
E1-1	132A	132B	LBI Petco Fasement	45	18									45

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
E1-1	132B	132C	LBI Petco Easement	97	18								
E1-1	132C	132D	LBI Petco Easement	193	18								
E1-1	132D	133	LBI Petco Easement	239	18								239
E1-1	133	125	LBI Petco Easement	321	18								321
E1-1	128	129	LBI Rt. 1 (N.B.)	290	18								290
E1-1	129	130	LBI Rt. 1 (N.B.)	134	18								134
E1-1	130	131	LBI Rt. 1 (N.B.)	328	18								328
E1-1	131	132	LBI Rt. 1 (N.B.)	237	18								237
E1-1	132	132A	LBI Rt. 1 (N.B.)	94	18								94
E1-1	127	128	LBI Rt. 1 Crossing	339	18								339
E1-1	106	127	LBI Washington St. Eas.	291	18								291
E1-2	61	60	East Street	124	8					1			
E1-2	60	60A	East Street	30	8					1			
E1-2	60A	59	East Street	120	8					2			
E1-2	59	58	East Street	215	8					215	2		
E1-2	58	57	East Street	153	10					153	1		
E1-2	57	54	East Street	278	10					278	1		
E1-2	54	53	East Street	56	10								1
E2	17	74	Church Street	54	10								
E2	74	55	Church Street	254	10								
E2	55	46	Church Street	256	10								1
E2	97	82	Court Street	188	8								
E2	82	68	Court Street	189	8								
E2	68	17	Court Street	176	8								
E2	302	310	Church Street	117	8								
E2	310	310B	East Street	399	8								2
E2**	595	563	High Street	309	12								2
E2	36	19	Marsh Street	212	6								3
E2	19	494	Marsh Street	215	6								3
E2	69	47	School Street	216	6								1
E2	47	46	School Street	321	8								1
E2	50	25	Village Avenue	291	8								
E2	25	17	Village Avenue	328	8								2
E2	244	254	Washington Street	245	8								
E2	254	272	Washington Street	242	8								3
E2	272	284	Washington Street	112	8								
E2	397	595	Washington Street	288	8								
E2	431	397	Washington Street	361	8								1
E2	431A	431	Washington Street	52	8								1
E2	449	431A	Washington Street	245	8								1

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
E2	469	449	Washington Street	225	8		225	2		1			
E2	494	469	Washington Street	268	8	268	268	1		1	4		
E3-1*	138	137	Central Avenue	174	8								174
E3-1*	144	143	Central Avenue	35	8			35					
E3-1	173	174	East Street	226	8	226	226						
E3-1	174	166	East Street	157	8	157	157	1					10
E3-1	166	162	East Street	245	8			245					
E3-1	155	154	East Street	83	6	83	83						
E3-1	154	156	East Street	228	8	228	228						
E3-1	156	157	East Street	212	8								
E3-1*	149	136	Jersey Street	210	8								210
E3-1	167	166	Park Street	251	8	251	251	1		8		2	1
E3-1	164	163	Puritan Lane	229	8								229
E3-1	163	162	Puritan Lane	232	8								232
E3-1	88	180A	Rustcraft Road Easement	208	18	208	208						
E3-1	180	180A	Rustcraft Road Easement	194	18	194	194						
E3-1	172	173	Walnut Street	255	8			255			27	1	1
E3-1*	115	116	Wentworth Street	116	8								
E3-1*	116	117	Wentworth Street	249	8			249					
E3-1**	142	141	West Jersey Street	231	8	231	231	1				1	
E3-1**	141	140	West Jersey Street	213	8	213	213					1	
E3-1*	140	139	West Jersey Street	156	8			156				1	
E3-2	43	42A	Allied Drive	298	8	298	298				9		
E3-2	42	41	Allied Drive	135	10								
E3-2	41	40	Allied Drive	211	12								
E3-2	70	71	Allied Drive Easement	184	12							1	
E3-2	69	70	Allied Drive Easement	78	12								
E3-2	68	69	Allied Drive Easement	198	12								
E3-2	67	68	Allied Drive Easement	60	10								
E3-2	59	67	Allied Drive Easement	131	8	131	131						
E3-2	71	51	Allied Drive Easement	198	12								
E3-2	51	50A	Allied Drive Easement	60	12								
E3-2	50A	50	Allied Drive Easement	97	12								
E3-2	50	49	Allied Drive Easement	141	12								
E3-2	40	39A	Allied Drive Easement	90	12						1		
E3-2	39A	39	Allied Drive Easement	182	12								
E3-2	1	2	Elm Street	193	8			193				1	
E3-2	2	3	Elm Street	169	8			169	2			1	
E3-2	3	4	Elm Street	169	8							1	
E3-2	4	5	Elm Street	169	8							1	

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
E3-2	6	5	Elm Street	49	8								
E3-2	7	6	Elm Street	198	8								
E3-2	8	7	Elm Street	253	8			253					
E3-2	9	8	Elm Street	301	8								
E3-2	14	13	Robinwood Road	52	8								
E3-2	13	12	Robinwood Road	270	8				270				2
E3-2	12	11	Robinwood Road	180	8			180					1
E3-2	11	10	Robinwood Road	293	8			293					3
E3-2	10	6	Robinwood Road	252	8								2
E3-2	17	18	Rustcraft Road Easement	263	12								
E3-2	18	19	Rustcraft Road Easement	303	12								
E3-2	19	19A	Rustcraft Road Easement	161	12								
E3-2	19A	20	Rustcraft Road Easement	54	12								
E3-2	21	20	Rustcraft Road	102	12								
E3-2	20	22	Rustcraft Road	284	12								2
E3-2	22	23	Rustcraft Road	195	12			195					
E3-2	23	24	Rustcraft Road	376	12								
E3-2	24	24A	Rustcraft Road	108	12								
E3-2	24A	25	Rustcraft Road	174	12								
E3-2	26	27	Rustcraft Road	162	12								
E3-2	27	28	Rustcraft Road	164	12								
E3-2	28	29	Rustcraft Road	177	12								
E3-2	29	30	Rustcraft Road	238	12								
E3-2	30	31	Rustcraft Road	237	12								
E3-2	31	32	Rustcraft Road	143	12								
E3-2	32	33	Rustcraft Road	95	12								
E3-2	33	34	Rustcraft Road	178	12								
E3-2	55	56	Willard Street	113	8								1
E3-2	56	57	Willard Street	246	8								1
E3-2	57	58	Willard Street	94	8								1
E3-2	58	59	Willard Street	46	8								
E3-2	59	60	Willard Street	48	8								1
E3-2	60	61	Willard Street	75	8								
E3-2	61	62	Willard Street	72	8								1
E3-2	62	63	Willard Street	151	8								1
E3-2	63	64	Willard Street	64	8								64
E3-2	64	65	Willard Street	72	8								72
E3-2	65	66	Willard Street	122	8								1
E4-1	81	82	Adams Street	267	8			267					1
E4-1*	8	9	Boulevard Road	269	8			269					4

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	
E4-1	9	5	Boulevard Road	262	8	262	262	1				1	
E4-1	3	4	East Street	234	8	234	234	2					
E4-1*	4	4A	East Street	18	8								
E4-1	4A	5	East Street	90	8				90	1			
E4-1	5	10	East Street	211	8								
E4-1	10	11	East Street	212	8					1			
E4-1	23	11	East Street	178	10								
E4-1	44	23	East Street	180	10					1			
E4-1	44	45	East Street	178	12					178			
E4-1*	82	79	East Street	76	12								
E4-1*	98	82	East Street	346	12				346	11			
E4-1	99	100	East Street	205	12								
E4-1	41	70	Elmwood Avenue	336	8				336		1		
E4-1	42	41	Elmwood Avenue	258	8				258		2		
E4-1	92	91	Elmwood Avenue	242	8						1		
E4-1	93	96	Elmwood Avenue	175	8				175	2			
E4-1**	93	91	Elmwood Avenue	174	8				174		7		
E4-1**	67	66	Grant Avenue	282	8				282		2		
E4-1**	94	95	Grant Avenue	245	8				245	2			
E4-1**	95	96	Grant Avenue	247	8				247		242		
E4-1**	96	97	Grant Avenue	255	8				255	1			10
E4-1	26	99	Greenwood Avenue	176	8								
E4-1	87	86	Hamilton Avenue	199	8				199	2			
E4-1	86	85	Hamilton Avenue	74	8								
E4-1	85	84	Hamilton Avenue	236	8				236	1			3
E4-1	84	79	Hamilton Avenue	270	8				270	2			
E4-1*	62	68	Jefferson Street	221	8				221				
E4-1*	68	69	Jefferson Street	210	8				210		1		
E4-1*	69	70	Jefferson Street	210	8								
E4-1	70	71	Jefferson Street	212	8				212	1			
E4-1	71	72	Jefferson Street	212	8				212	1			
E4-1	72	46	Jefferson Street	213	8				213		1		
E4-1*	25	24	Madison Street	285	8				285	1			
E4-1	26	24	Madison Street	167	8				167				
E4-1	33	34	Madison Street	251	8				251		4		
E4-1	34	35	Madison Street	234	8				234	1			30
E4-1	35	36	Madison Street	221	8				221	1			10
E4-1	39	40	Madison Street	291	8				291	9			
E4-1	40	41	Madison Street	293	8					1			293
E4-1	41	43	Madison Street	323	8				323	323	1	1	

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services				Sewer Relining/Replacement
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	
E4-1	43	44	Madison Street	322	8	322	322	1		1		1	
E4-1	14	15	Monroe Street	226	8	226	226	3				1	65
E4-1	15	16	Monroe Street	228	8	228	228	3				1	
E4-1	13	12	Monroe Street	180	8		180	2		1		2	
E4-1	22	11	Monroe Street	273	8	273	273			1	1	1	
E4-1	37	36	Mt. Vernon Street	120	8	120	120	1		2		1	
E4-1	46	73	Rustcraft Road	220	18		220	4	20				
E4-1	73	77	Rustcraft Road	192	18					1		192	
E4-1	77	77A	Rustcraft Road	200	18					200			
E4-1	77A	77B	Rustcraft Road	254	18					1			
E4-1	77B	180	Rustcraft Road	312	18								312
E4-1	2	3	Sanderson Avenue	313	8	313	313					1	
E4-2	414	425	Cedar Street	199	8	199	199	1		6			
E4-2	425	441	Cedar Street	175	8	175	175	4		1		1	
E4-2	441	455	Cedar Street	171	8		171	6				3	
E4-2	32	455	Sprague Street	197	8	197	197			6		1	
E4-2	455	884	Sprague Street	103	12		103						10
E4-2	884	882	Sprague Street	104	12								
E4-2	66	50	Sprague Street	247	8	247	3			2			
E5**	22	21	Chester Avenue	268	8							1	
E5	1 (901)	2 (898)	East Street	163	12	163	163						
E5	2 (898)	3 (911)	East Street	51	12	51	51						
E5	3 (911)	4 (934)	East Street	263	12		263			37		1	
E5	4 (934)	5 (938)	East Street	109	12		109			28			
E5	5 (938)	6 (961)	East Street	213	12								213
E5	6 (965)	7 (976)	East Street	201	12								201
E5	7 (976)	8 (990)	East Street	167	12								
E5	8 (990)	9 (991)	East Street	86	12								
E5	9 (990)	10 (1002)	East Street	177	12								
E5	10 (1002)	11 (1010)	East Street	129	12					129			
E5	11 (1010)	12 (1028)	East Street	126	12					126			
E5	12 (1028)	13 (1031)	East Street	127	12					127			
E5	13 (1031)	14 (1044)	East Street	126	12								126
E5	14 (1044)	15 (1069)	East Street	262	12								262
E5	15 (1069)	16 (1077)	East Street	98	12					98			
E5	16 (1077)	17 (1085)	East Street	79	12					79			
E5	17 (1085)	18 (1102)	East Street	246	12					246	2		
E5	18 (1102)	19 (1106)	East Street	27	12								
E5	19 (1106)	20 (1115)	East Street	209	12					209			
E5	20 (1115)	21 (1130)	East Street	270	12								270

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (#)	Localized Spot Repair (ft)	Lineal Spot Repair (#)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
E5	21 (1130)	22 (1142)	East Street	130	12									130
E5	22 (1142)	23 (1154)	East Street	172	12									172
E5	23 (1154)	24 (1188)	East Street	249	12									249
E5	3 (911)	27 (110)	Hermaine Avenue	151	8				151		31			
E5	27 (10)	28 (28)	Hermaine Avenue	154	8					154				
E5	10 (1010)	33 (140)	Lamoine Street	178	8				178					
E5	33 (14)	34 (24)	Lamoine Street	154	8									154
E5	8 (990)	30 (24)	Preston Street	252	8				252					
E5	30 (24)	31 (34)	Preston Street	141	8					141	11			
E5	31 (34)	32 (38)	Preston Street	117	8					117				
E5	20 (1115)	38 (63)	Sidney Street	266	8				266					
E5	17 (1085)	35 (28)	Southgate	352	8				352		31			
E5	35 (28)	36 (46)	Southgate	236	8					236	21			
E5	36 (46)	37 (60)	Southgate	184	8					184		1		
E5	2 (899)	25 (118)	Top Hill Avenue	258	8									258
E5	25 (18)	26 (34)	Top Hill Avenue	145	8				145		145			
E5	4 (934)	29 (28)	Upland Road	325	8					325				
E5	22 (1142)	39 (22)	Winfield Street	235	10									235
e**	138	132	Massachusetts Avenue	88	8				88	88	1			
e**	132	124	Massachusetts Avenue	126	8				126	1		1		
E6	82	77	Allindale Way	378	8									378
E6*	96	97	Martin Bates Street	172	8					1		1		
E6*	10	32	Booth Road	224	8				224					
E6	63	62	Bridge Street	317	8				317	3		2		
E6	62	59	Bridge Street	304	8				304	4				
E6	60	59	Common Street	255	8									255
E6*	58	58	Common Street	368	8				368	10		1		10
E6*	114	113	Newcourt Lane	248	8									
E6	113	112A	Court Street	202	8				202	4		1		
E6	112A	112	Court Street	283	8					283	5	1		
E6	112	109	Court Street	242	8					242	3			
E6	109	107	Court Street	325	8					325	9	2		
E6	107	106	Court Street	158	8					158	3	1		
E6	119	118	Court Street	303	8					303	1	1		
E6	118	105	Court Street	43	8					43	9			
E6*	43	44	High Street	139	8									
E6	100	99	Highland Street	253	8					253	5			
E6*	17	18	Robert Road	84	8					84				
E6*	38	39	ROW (School)	208	8					208				
E6*	39	42	ROW (High Street)	154	8									

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
E6	84	83	Wampatuck Road	213	8	213	213	3						196
E6	87	86	Wampatuck Road	196	8									173
E6	86	85	Wampatuck Road	173	8									174
E6	85	82	Wampatuck Road	174	8									243
E6	83	82	Wampatuck Road	243	8									
E7	39	40	Anthony Lane	108	8									
E7	40	41	Anthony Lane	88	8									
E7	41	42	Anthony Lane	139	8									
E7	41	43	Anthony Lane	380	8									
E7	44	45	Chute Road	341	8									
E7	45	46	Chute Road	167	8									
E7	46	47	Chute Road	22	8									
E7	48	47	Chute Road	200	8									
E7	94	93	Chute Road	130	8									
E7	93	92	Chute Road	214	8									
E7	92	91	Chute Road	119	8									
E7	91	90	Chute Road	93	8									
E7	90	77	Chute Road	151	8									
E7	138A	137A	Commercial Circle off Rt. 1	139	12									
E7	137A	136A	Commercial Circle off Rt. 1	194	12									
E7	136A	135A	Commercial Circle off Rt. 1	191	12									
E7	116	117	Elm Street	265	8									
E7	117	118	Elm Street	184	8									
E7	119	120	Elm Street	91	10									
E7*	120	121	Elm Street	148	10									
E7*	10	11	Fair Oak Road	171	8									
E7	88	87	Harmony Hill	63	8									
E7	89	88	Harmony Hill	113	8									
E7	87	85	Harmony Hill	202	8									
E7	74	73	Highland Street	251	8									
E7	73	72	Highland Street	95	8									
E7	72	71	Highland Street	53	8									
E7	71	70	Highland Street	155	8									
E7	70	69	Highland Street	104	8									
E7	69	68	Highland Street	85	8									
E7	68	62	Highland Street	48	8									
E7	62	75	Highland Street	16	8									
E7	76	77	Highland Street	213	8									
E7	77	78	Highland Street	193	8									
E7	78	79	Highland Street	99	8									

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Sewer Pipeline Rehabilitation			Rehabilitation of Services			Sewer Relining/Replacement	
						Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
E7	79	80	Highland Street	101	8			101	3				
E7	80	81	Highland Street	255	8			255	9	6	1	3	
E7	82	81	Highland Street	65	8			65	2	11			
E7	65	66	Karen Pines	162	8								
E7	66	67	Karen Pines	195	8								
E7	115	114	Lee Terrace	197	8			197	4				
E7	38	37	Manning Road	224	8			224	3				2
E7	37	36A	Manning Road	45	8			45		5			
E7	36A	36	Manning Road	192	8			192	1				2
E7	36	35	Manning Road	214	8			214	3				
E7	35	34	Manning Road	109	8			109	2				
E7	34	33	Manning Road	129	8			129		1			
E7	33	32	Manning Road	143	8			143	2				
E7	32	31	Manning Road	138	8			138	2				
E7	31	30	Manning Road	133	8			133	3				
E7	30	29	Manning Road	86	8			86		1			
E7	29	28	Manning Road	111	8			111		1			
E7	28	27	Manning Road	52	8			52	1				
E7	54	53	Pacella Drive	144	8			144	3	31			
E7	46	46A	Pacella Drive	203	8			203	5	7			
E7	46A	51	Pacella Drive	84	8			84	2	27			
E7	51	52	Pacella Drive	21	8								21
E7	52	53	Pacella Drive	95	8			95					
E7	50	49	Pacella Drive	197	8			197	4				
E7	49	49A	Pacella Drive	166	8			166	2				
E7	49A	46	Pacella Drive	24	8			24	1				24
E7	53	55	Pacella Drive	77	10			77					129
E7	55	55A	Pacella Drive	139	10			139	139	1			
E7	55A	56A	Pacella Drive Easement	82	10			82		1			10
E7	56A	56	Pacella Drive Easement	24	10								
E7	61	60 A	Pacella Drive Easement	138	8								
E7	60 A	60	Pacella Drive Easement	129	8			129					
E7	59	60	Pacella Drive Easement	126	8			126	2	6			
E7	60	62 A	Pacella Drive Easement	102	8			102		1			
E7	62 A	62	Pacella Drive Easement	129	8								
E7	60C	60D	School Yard Easement	38	8								
E7	60 C	60 B	School Yard Easement	169	8			169	3				20
E7	60 B	60 A	School Yard Easement	170	8			170	1				
E7	121	122A	US Route 1 (N.B.)	240	10			240	4	6			
E7	122A	122	US Route 1 (N.B.)	308	10			308	6	2			

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (#)	Localized Spot Repair (ft)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
E7	122	123A	US Route 1 (N.B.)	187	10		187	4		1			
E7	123A	123	US Route 1 (N.B.)	249	10		249	1		2			
E7	18	9	Washington Street	263	8		263			1			
E7	9	19	Washington Street	85	8								
E7	19	20	Washington Street	8	8								
E7	20	20A	Washington Street	238	8								
E7	20A	21	Washington Street	61	8								
E7	21	22	Washington Street	220	8								
E7	22	23	Washington Street	183	6								
E7	23	24	Washington Street	112	8								
E7	24	25	Washington Street	244	8								
E7	25	26	Washington Street	35	8								
E7	26	27	Washington Street	185	8								
E7	27	97	Washington Street	186	8								
E7	97	98	Washington Street	200	8								
E7	98	99	Washington Street	214	8								
E7	100	101	Washington Street	159	8								
E7	102	101	Washington Street	256	8								
E7	103	102	Washington Street	57	10								
E7	132	132 A	Washington Street	236	8								
E7	132	133	Washington Street	182	8								
E7	133	134	Washington Street	193	8								
E7	134	135	Washington Street	190	8								
E7*	135	136	Washington Street	97	8								
E7*	136	137	Washington Street	248	12								
E7*	137	138	Washington Street	129	12								
E7*	130	130A	Washington Street Ease	146	12								
E7*	130A	130B	Washington Street Ease	168	12								
E7*	130B	136	Washington Street Ease	145	12								
E7	101	110	Wilson Avenue	222	8								
E7	110	110A	Wilson Avenue	46	10								
E7	110A	111	Wilson Avenue	200	10								
E7	111	112	Wilson Avenue	236	10								
E7*	112	124	Wilson Avenue	69	10								
E7	123	124	Wilson Avenue	145	10								
E7	112	125	Wilson Avenue Easement	255	12								
F1**	35	36	Bridge Street	197	12								
F1**	36	37	Bridge Street	195	12								
F1**	37	38	Bridge Street	265	12								
F1**	38	39A	Bridge Street	258	12								

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Sewer Pipeline Rehabilitation			Rehabilitation of Services			Sewer Relining/Replacement		
						Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
F1**	39A	39	Bridge Street	225	12									
f	37	20	Bonad Road	189	8	189	189	4				2		
f	20	14	Bonad Road	92	8	92	92					4		225
f	16	24	Lower East Street	171	8	171	171	2						
f	24	32	Lower East Street	175	8	175	175	2				7		
f	32	40	Lower East Street	67	8	67	67	1				5		
f	40	51	Lower East Street	160	8			160						
f	51	74	Lower East Street	314	8	314	314	1				5		
f	74	82	Lower East Street	66	8	66	66							
f	82	91	Lower East Street	149	8	149	149	1						
f	91	103	Lower East Street	47	8									
f	103	103A	Lower East Street	91	8	91	91					1		
f	13	51	Summer Street	207	8									207
f	14	40	Willis Street	206	8	206	206	1				1		10
G1**	18	19	Marlboro Street	215	8	215	215							
G1**	123	115	Massachusetts Avenue	98	8							1	1	
G1**	97	115	Massachusetts Avenue	260	8	260	260							10
G1**	97	86	Massachusetts Avenue	148	8									
G1**	86	78	Massachusetts Avenue	20	8	20	20							
G1**	78	61	Massachusetts Avenue	237	8	237	237	1				1		60
G1**	61	41	Massachusetts Avenue	251	8	251	251					1	3	
G1**	41	19	Massachusetts Avenue	299	8			299	1			2		
G1**	13	19	Massachusetts Avenue	41	8									
G1	6	13	Massachusetts Avenue	193	8	193	193							
g1	44	30	Brookdale Avenue	158	8	158	158	2						
g1	30	20	Brookdale Avenue	193	8	193	193	3						
g1	20	233	Brookdale Avenue	165	8	165	165	3				1		
g1	307	272	East Street	227	6			227				1		
g1	272	250	East Street	233	8	233	233	4				1	3	
g1	250	223	East Street	263	8									263
g1	219	223	East Street	181	8	181	181	4						
g1	201	219	East Street	175	8	175	175	3				1		
g1	154	153	Washington Street	197	8	197	197	3						
g2	153	125	Eastbrook Road	109	8	109	109							
g2	125	20	Eastbrook Road	179	8	179	179	4				6		10
g2	20B	20	Eastbrook Road	55	8									55
g2	20B	21	Eastbrook Road	88	8	88	88					1		
g2	21	103A	Lower East Street	156	8	156	156	1						
g2	190	198	Washington Street	167	8	167	167	1						
h	58	24	Oak Street	209	8	209	209	4				1	2	

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Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services				Sewer Relining/Replacement
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	
h	24	12	Oak Street	226	8			226	1		1		
h	82	68	Oak Street	186	8		186	186	2		3		
h	68	54	Oak Street	188	8		188	188	1		1		
h	54	58	Oak Street	206	8		206	206					1
h	46	32	Ridge Avenue	169	8		169	169	6		6		1
h	32	18	Ridge Avenue	242	8		242	242	3		1		3
h	18	24	Ridge Avenue	222	8		222	222	1		42		
h	116	106	Schiller Road	165	8		165	165	1				2
h	106	92	Schiller Road	191	8			191	2				
h	92	75	Schiller Road	197	8			197	1				1
h	75	58	Schiller Road	178	8								
h	12	20	Washington Street	234	8		234	234					
h	20	38	Washington Street	234	8		234	234	3		3		
h	38	62	Washington Street	233	8		233	233					
h	62	237	Washington Street	250	8			250					1
H1	41	31B	East Riverside Drive	112	8								112
H1	31B	19	East Riverside Drive	218	8								218
H1	19	7	East Riverside Drive	93	8			93	1		13		1
H1**	74	72	Pine Hill Road	109	8			109	3				
H1**	72	51	Pine Hill Road	303	8		303	303	2				
H1	262	282	Riverside Drive	202	8		202	202	1				
H1	282	296	Riverside Drive	203	8			203	7		48		
H1	296	300	Riverside Drive	139	8		139	139	3		1		
H1	262	250	Riverside Drive	202	8		202	202					2
H1	250	227	Riverside Drive	266	8		266	266	15		3		1
H1	227	211	Riverside Drive	199	8			199	4				
H1	211	197	Riverside Drive	197	8								1
H1	197	191	Riverside Drive	71	8			71					1
H1	191	171	Riverside Drive	225	8		225	225					
H1	171	155	Riverside Drive	235	8		235	235					
H1	155	134	Riverside Drive	192	8		192	192					
H1	134	121	Riverside Drive	137	8								
H1	121	106	Riverside Drive	287	8								
H1	6	7	Riverside Drive	72	12			72					
H1	7	24	Riverside Drive	217	12		217	217	1				60
H1	24	36	Riverside Drive	103	12		103	103					1
H1	36	40	Riverside Drive	115	12								
H1	40	56	Riverside Drive	126	12								
H1	56	60	Riverside Drive	205	12		205	205	2				
H1	60	86	Riverside Drive	202	12			202					

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement	
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)
H1	86	106	Riverside Drive	217	12			217	1				
i	15	9	Columbia Terrace	102	8	102	102						
i	9	7	Columbia Terrace	81	8	81	81						
i	7	222	Columbia Terrace	213	8	213	213	2		1			
i	160	138	Curve Street	239	8					1	1		
i	138	122	Curve Street	194	8					1			
i	122	109	Curve Street	207	8			1		2			
i**	176	182	Curve Street	131	8	131	131						
i**	182	202	Curve Street	265	8					1	1	265	
i**	202	222	Curve Street	230	8					1		230	
i**	222	236	Curve Street	139	8					2		139	
i**	236	237	Curve Street	151	8					1		151	
i	14	54	Evergreen Way	196	8								
i	14	138	Harvey Drive	174	8								
i	25	160	Hitchins Drive	298	8	298	298	5					174
i	9	130	Lilac Lane	190	8	190	190						
i	6	34	Maverick Street	342	8	342	342	1		1		1	
i	34	45	Maverick Street	219	8	219	219	4		2			
i	45	54	Maverick Street	48	8	48	48	1					
i	54	65	Maverick Street	170	8	170	5	6		1			
i	88	34	Oak Street	151	8	151	151	1					
i	34	114	Oak Street	189	8		189			1		1	
i	114	130	Oak Street	198	8		198			1		1	
i	130	176	Oak Street	120	8	120	120						
i	24	32	Belknap Street	333	6	333	333	4				4	
i	315	291	Colburn Street	243	8	243	243				1		
i	291	275	Colburn Street	254	8	254	254	2					
i	275	275B	Colburn Street	76	8	76	76	5					
i	275B	245	Colburn Street	230	8	230	3			1		1	
i	245	48	Colburn Street	227	8	227	227	3					
i	98	16	Curve Street	101	8					6			
i	16	83	Curve Street	106	8								
i	83	73	Curve Street	161	8	161	161	1					
i	73	66	Curve Street	50	8								
i	66	52	Curve Street	153	8		153			1		1	
i	52	34	Curve Street	210	8	210	1			1		1	
i	34	32	Curve Street	54	8	54	243	1		6			
i	32	48	Curve Street	243	8								
i	48	223A	Curve Street	36	8								
i	223A	223	Curve Street	136	8	136	136			1			

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Dia (in)	Sewer Pipeline Rehabilitation			Rehabilitation of Services			Sewer Relining/Replacement		
						Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
j	9	275	Denmark Street	157	8	157	157	2			1			
j	18	9	Denmark Street	99	8	99	99	2		2				
j	90	60	Gaffney Road	217	8									
j	14	30	Gaffney Road	233	8									
j	13	42	Gould Street	266	8	266	266				2		1	
j	22	16	Hirsch Terrace	91	8	91	91	1			1			
j	90	22	Hirsch Terrace	176	8	176						1		17
j	16	52	Mt. Hope Street	192	8	192	192	3				3		
j	37	52	Mt. Hope Street	170	8	170	170			7		3		
j	52	59	Mt. Hope Street	109	8	109	109	2				1		
j	59	67	Mt. Hope Street	123	8	123	123					1		
j	67	85	Mt. Hope Street	162	8	162	162	1				1		
j	85	66	Mt. Hope Street	206	8	206								206
j	27	16	Mt. Hope Street	149	8	149								
j**	7	97	Nancy Road	205	8	205	205	4				3		
j	2	37	Raven Hill	126	8	126	126	1				1		2
j**	115	103	Sunset Avenue	143	10	143								143
j**	81	90	Sunset Avenue	95	10	95								95
j**	90	103	Sunset Avenue	165	10	165	165	1				1		
j**	103	7	Sunset Avenue	75	10	75	75			5		2		
j	42	30	Waldo Street	56	8	56	56	1						
j	30	20	Waldo Street	200	8	200	200	1						
j	20	34	Waldo Street	200	8	200	200	1				2		
J1*	30	31	Cunningham Road	252	8									
J1	187	167	Needham Street	233	8	233	233	1			1			
J1	167	161	Needham Street	234	8	234	234	1			3			
J1*	33	28	Rosemary Road	226	10									226
J1*	23	20	Rosemary Road	227	10	227	227							
J1*	20	12	Rosemary Road	285	10									
J1	42	41	Vine Rock Street	182	8	182								285
J1	41	40	Vine Rock Street	232	8	232	232	2						
J1	40	39	Vine Rock Street	229	8	229								
k	2	3	Bussey Street	178	8	178	178				1			
k	3	6	Bussey Street	177	8	177	177	2		17		2		
k	6	8	Bussey Street	284	8	284						1		
k	8	12	Bussey Street	22	8									
k	12	13	Bussey Street	162	8							3		
k	13	14	Bussey Street	252	8	252								
k	14	23	Bussey Street	180	8	180	180	1			1			
k	23	25	Bussey Street	361	8	361					1	3		

TABLE 8. SUMMARY OF RECOMMENDED PIPELINE REPAIRS

Sewer Sub area	From MH	To MH	Street Name	Pipe Length (ft)	Sewer Pipeline Rehabilitation				Rehabilitation of Services			Sewer Relining/Replacement		
					Pipe Dia (in)	Root Control (ft)	Joint T&S (ft)	Localized Spot Repair (#)	Lineal Spot Repair (ft)	Cut & Grout Service (#)	Grout Service (#)	Dig & Replace Service (#)	Reline Pipe (ft)	Dig & Replace (ft)
k	25	25A	Bussey Street	93	8			93				1		
k	25A	26	Bussey Street	203	8			203	2			1		
l	207	231	Bussey Street	192	8			192	3	11				
l	231	247	Bussey Street	209	8			209	2			1		
l	247	14	Bussey Street	203	8			203	1			1		
l	366	350	High Street	116	8			116	1			1		
l	350	340	High Street	214	8			214	1			1		
l	340	329	High Street	231	8			231		8				
l	329	306	High Street	216	8			216	1	6		1		
l	1	209	High Street	242	8			242				1		
l	209	238	High Street	242	8			242	1					
l	238	306	High Street	242	8			242		50		1		
l**	45	27	Milton Street	200	8			200				3		
l**	27	27A	Milton Street	137	8							1		
n	1	2	High Street	299	8			299	1			3		
n	2	6	High Street	221	8			221		6		1	2	
n*	6	7	High Street	126	8			126	1					
n	7	10	High Street	92	8			92	1					
n	10	14	High Street	273	8			273		7		3	1	
Total=				46,197	94,235	679		1,210	282	209		84	12,303	17,313
Unit Cost=				\$ 2.00	\$ 5.00	varies (1)		varies (2)	\$ 600	\$ 300	\$ 2,500	varies (3)	varies (4)	
Sub-Total Cost ⁽⁵⁾ =				\$ 92,394	\$ 471,175	\$ 500,763	\$ 329,200	\$ 169,200	\$ 62,700	\$ 210,000	\$ 2,166,200	\$ 2,724,300		

Notes:

(1) Assume 65% of the spot repairs will be using Link Pipe @ \$1,000 each, and 35% of the spot repairs will be using grouted joints @ \$250 each

(2) \$1,700 for each set up plus \$140 per foot of CIPP Spot Repair.

(3) Unit cost varies with size of pipe to be relined. Unit cost used are 8"=\$100/ft; 10 & 12=\$110/ft; 1.5"=\$125/ft; 18"=\$150/ft; 24"=\$225/ft; and 24" X 36"=\$300/ft.

(4) For replacement of manhole to manhole reaches, a unit cost of \$150 was used. For pipe replacement of short sections of sewer (i.e., 15 to 30 feet in length), a unit cost of \$250 was used.

(5) The estimated costs for the recommended program which are referenced in the report were determined as follows:

- Sewer pipeline rehabilitation includes the costs for root control, joint testing and sealing, and spot repairs plus an allowance for engineering and contingency = \$1,951,000

- Sewer replacement includes the cost for digging and replacing pipe plus an allowance for engineering and contingency = \$3,793,000

- Relining of services includes the cost of cutting and/or grouting services plus an allowance for engineering and contingency = \$325,000

* Sewers previously television inspected by M&E between 1992-1994

** Sewers television inspected by Araco under separate contract to the town

TABLE 9. SUMMARY OF RECOMMENDED MANHOLE REPAIRS

Type of Repair	Number of Manholes ⁽¹⁾	Estimated Unit Cost	Total Estimated Repair Cost
Manhole Cleaning	91	\$250	\$22,750
Chimney Repairs	105	\$300	\$31,500
Reset Frame and Cover	13	\$350	\$4,550
Replace Frame and Cover	30	\$600	\$18,000
Chemical Sealing	40	\$700	\$28,000
Interior Coating	29	\$1,200	\$34,800
Bench Repairs	19	\$350	\$6,650
Invert Repairs	22	\$350	\$7,700
Replace Manhole	6	\$3,000	\$18,000
Subtotal Repair Costs			\$171,950
plus Engineering and Contingency			\$69,050
TOTAL ESTIMATED COST			\$241,000

Note:

(1) Refer to Table 4 for a summary listing of defects for each manhole to be repaired.

TABLE 10. SEWERS REQUIRING ADDITIONAL CLEANING

Sewer Subarea	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Size (in)
A1	8	10	Whiting Avenue	360	8
E3-1	37	36	Rustcraft Road	224	12
E3-1	38	37	Rustcraft Road	225	12
E3-1	72	38	Central Avenue	205	12
E3-1	88	72	Madison Street	601	12
E3-1	88	180A	Rustcraft Road Easement	208	16
E3-1	180A	180	Rustcraft Road Easement	194	16
E3-2	9	8	Elm Street	301	8
E3-2	5	5A	Rustcraft Road Easement	220	12
E3-2	5A	15A	Rustcraft Road Easement	30	12
E3-2	15A	15B	Rustcraft Road Easement	160	12
E3-2	15B	15	Rustcraft Road Easement	20	12
E3-2	15	16	Rustcraft Road Easement	75	12
E3-2	16	17	Rustcraft Road Easement	45	12
E3-2	17	18	Rustcraft Road Easement	263	12
E3-2	18	19	Rustcraft Road Easement	302	12
E3-2	19	19A	Rustcraft Road Easement	61	12
E3-2	19A	20	Rustcraft Road Easement	54	12
E3-2	21	20	Rustcraft Road	102	12
E3-2	20	22	Rustcraft Road	284	12
E3-2	22	23	Rustcraft Road	195	12
E3-2	23	24	Rustcraft Road	376	12
E3-2	24	24A	Rustcraft Road	108	12
E3-2	24A	25	Rustcraft Road	174	12
E3-2	25	26	Rustcraft Road	279	12
E3-2	26	27	Rustcraft Road	162	12
E3-2	27	28	Rustcraft Road	164	12
E3-2	28	29	Rustcraft Road	177	12
E3-2	29	30	Rustcraft Road	238	12
E3-2	30	31	Rustcraft Road	237	12
E3-2	31	32	Rustcraft Road	143	12
E3-2	32	33	Rustcraft Road	95	12
E3-2	33	34	Rustcraft Road	178	12
E3-2	34	35	Rustcraft Road	177	12
E3-2	35	36	Rustcraft Road	162	12
E3-2	24A	39	Allied Drive	220	12
E3-2	39	39A	Allied Drive	182	12
E3-2	39A	40	Allied Drive	90	12
E3-2	41	40	Allied Drive	211	12
E3-2	42	41	Allied Drive	135	10
E3-2	59	67	Allied Drive Easement	131	8
E4-1	46	73	Rustcraft Road	222	18
E4-1	73	77	Rustcraft Road	197	18
E4-1	77	77A	Rustcraft Road	200	16
E4-1	77A	77B	Rustcraft Road	254	16
E4-1	77B	180	Rustcraft Road Easement	318	18
E7	99	106	Elm Street	260	8

TABLE 10. SEWERS REQUIRING ADDITIONAL CLEANING

Sewer Subarea	From MH	To MH	Street Name	Pipe Length (ft)	Pipe Size (in)
E7	99	100	Washington Street	294	8
E7	100	101	Washington Street	159	8
E7	112	125	Wilson Avenue to Dedham Plaza	255	12
E7	125	126	Wilson Avenue to Dedham Plaza	180	12
E7	126	129	Wilson Avenue to Dedham Plaza	480	12
E7	129	128	Wilson Avenue to Dedham Plaza	280	12
E7	128	130	Wilson Avenue to Dedham Plaza	250	12
E7	135A	125	Under US Rte 1 (N.B.)	300	8
E7	140A	128	Crossing Rte 1 @ Dedham Plaza	375	8
E7	140B	140A	Crossing Rte 1 @ Dedham Plaza	200	8
g1	44	30	Brookdale Avenue	158	8
G1	20	6	Riverview Street	200	8
H1	155	134	Riverside Drive	200	8
i	176	160	Curve Street	200	8
Total				12,750	